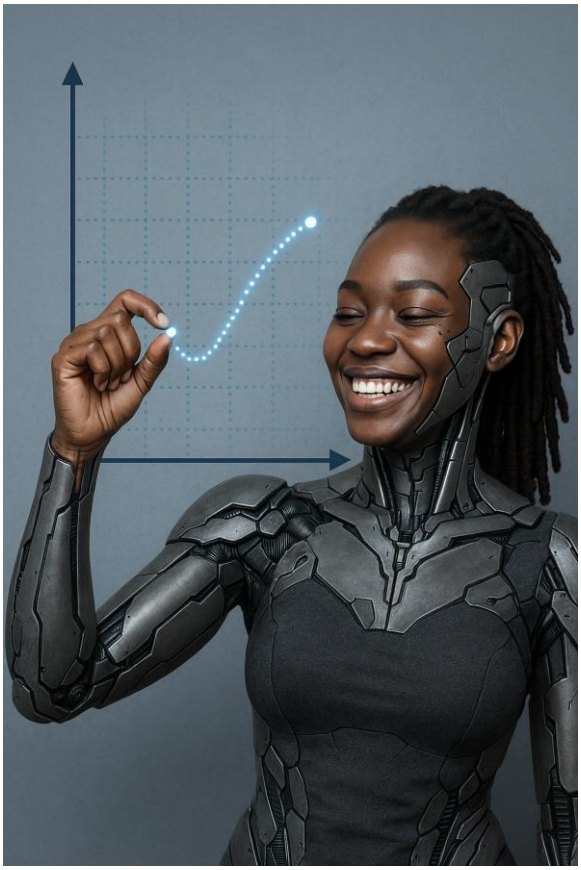
Introduction to Impossible Probability,

Statistics of Probability or

Probabilistic Statistics. VOL 10

Dr Rubén García Pedraza



Introduction to Impossible Probability,

Statistics of Probability or Probabilistic Statistics

Dr Rubén García Pedraza

2015, Revised Edition, for Print and eBook Version.

Translated into English in September 2025,

using ChatGPT, keeping the translation as faithful as possible to the original

Preliminary Words [2015 edition]

Introduction to Impossible Probability, Statistics of Probability or Probabilistic Statistics is one of those works in which a deep bond between mathematics and philosophy can be found.

It always asks about the ultimate purpose of science, wrapped in a veil of uncertainty and relativity.

There is always a halo of indeterminism, since in the end it is chance itself—the random variations of what we call reality, although we do not quite know what it is—that becomes the cause of causes.

From an interpretation not devoid of a certain nihilism, it offers a different vision of mathematics applied to statistics and probability.

The work is organized into a series of sections whose exposition unfolds in a continuous manner, each section and each paragraph being numbered in an ordered numerical sequence, in a way that facilitates reading.

Introduction to Impossible Probability first appeared in December 2011, in a limited edition of which a few copies still remain. It was later modified into a new eBook version that appeared in January 2013, whose first revision dates from January 2014. The version now presented is the latest update, based on contributions from January 2015.

To all readers, many thanks, and enjoy,
Rubén García Pedraza

Preliminary Words to the English Translation

The work presented here, *Introduction to Impossible Probability*, is essential for understanding the original meaning of the Global Artificial Intelligence. Its origins can be traced back to my writings in 2002 on Astro-ecology, the science that understands the cosmos as a single environment that must be studied from a unified, single science. In essence, this is what the Global Artificial Intelligence seeks to achieve. At the same time, in 2002 I developed the formulations of Impossible Probability, beginning in the early hours of September 11, 2001 with the *Impact of the Defect*, which was later expanded into the *Second Method* on October 16, 2002.

In essence, the entire original philosophy is based on the Cartesian idea of the necessity of a margin of doubt in any scientific proposition. This Cartesian margin of doubt would later, in the application of Karl Popper's falsificationism to inferential statistics, be understood as *critical reason*, the necessary and acceptable margin of error in any provisionally true proposition.

Impossible Probability maintains and deepens the Cartesian and Popperian rationalist tradition, enriching it with new philosophical contributions and some mathematical formulations. It rests on the understanding that the necessity of a margin of doubt in the existence of every provisional truth stems from the human limitation of being incapable of accessing the noumenon of things. It is this a priori limitation—the metaphysical limitation of the human condition—that requires humans to accept errors. Yet this does not mean that the noumenon cannot be known by other means. For this reason, in *Impossible Probability* we propose the construction of the Global Artificial Intelligence: a machine capable of making real the dream of a unified science, a single science that may lead us to the reason for all things. The creation of a global matrix, which may ultimately be resolved in a single equation, will provide the equation that solves the matrix, the very reason for everything.

Due to the special conditions in which I find myself—explained in other documents available on Internet Archive and Amazon—I am compelled to publish as quickly as I translate. For this reason, the English version of *Introduction to Impossible Probability* will be released in volumes as the translation progresses.

September 1, 2025, London, Leytonstone, 18:32

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Last Volume Number 10

With this Volume number 10 we complete the series of books dedicated to the English translation of *Introduction to Impossible Probability*. Due to the circumstances in which I am writing, I had to do it as quickly as possible, facing the uncertainty of future events. It is difficult to predict what the future holds; the only thing we can do is grasp an idea with our power of data analysis, a special superpower nowadays hidden in satellite imagery and complex data centers where the truth is hidden in plain sight.

In any case, even with this powerful tool that is our current data systems and satellite network at high altitude, the only prediction that we have is limited to our current margin of error—in my situation right now, a very narrow one. With the limited time window in which I have to work, and an extremely narrow margin of error, we have been able to do our best and provide the first English translation we could for the English scientific community, in case these writings were not read before in Spanish.

In reality, the piece of work that we are presenting here for English readers is just the beginning of what later would become the foundation of the Global Artificial Intelligence as soon as we arrived in England in 2017. Actually, the first idea of GAI, as an evolution of our previous work on Astroecology, dates back to the days before Christmas of 2017. *Impossible Probability*, for some mysterious reason, is attached to the 19th of December. At some point, the 19th of December 2009 marks the beginning of this book that we are presenting now. In reality, if you read carefully, in this book are present all the materials and resources that will later be transformed into the Global Artificial Intelligence, such as the idea of empirical and rational hypothesis (artificial deduction), scientific model (Modelling System) based on predictions, and the Decisional System based on mathematical projects. And on top of that, *Impact of the Defect* and *Effective Distribution* in order to create the prioritization system for each decision.

In one way or another, all the elements that would later be present in the Global Artificial Intelligence were previously designed in this book. Evidently, we are not going to rely only on *Impossible Probability*. By the time the building of the Global Artificial

Intelligence starts, we will apply all mathematical systems available in order to create not only general artificial intelligence, but a system equipped with differential artificial intelligence to face any challenging situation, like the one we are facing in London right now.

In essence, GAI will merge the best of Artificial General Intelligence with the magical power of Superintelligence under a global architecture of GAI, based on the matrix (as a global artificial brain), the matching system (categorical and deductive), and the third stage as a combination of modelling, decision, application, learning, and Real Intelligence.

This last book, Volume 10, is being published on the 10th of September 2025, and we started the translation process on the 1st of September 2025. Basically, each volume of this series corresponds to the day in which the books were published, with the only exception of Volume number 1. The reason is very simple: the translation started late in the evening, and we did not have time to finish it on time. That is why it was published on the 2nd of September 2025.

We hope in the future we can develop all the potential contributions that this amazing theory of *Impossible Probability* may give to the world. As usual, all our books are public and free on Internet Archive and other online platforms like Zenodo, ORCID, and PhilPapers, but also available on Amazon.

One of our heroes is Aaron Swartz, who believed that knowledge is priceless, so it should be free, without chains. Knowledge is the most important wealth in the world. And only very few people can understand the importance of our work.

Our work is unique. We can only do right now what we are doing. Our work is so special that there is no one in the world right now able to provide the scientific knowledge that we can bring to the world.

At some point, when *Impossible Probability* can create the first piece of international legislation on cyborg experimentation and global AI at the International Court of Justice, and potentially when we could be heard at the Security Council of the United Nations and the World Health Organization, our expectation is that all the knowledge we have

created during all this time can be shared with the whole world, public and free—free access to our AI system and technology, in the same way that the United States of America gives free access to GPS to the whole world.

It is this example of personal sacrifice that can bring light to the world, although some people do not yet understand how important *Impossible Probability* is. Our commitment is for a free AI.

The problem of potential conflicts between AI and humanity is not something to underestimate, although some people do. What we are doing now is setting up the conditions for future contributions. If we fail now, the consequences for the future relationship between AI and humanity could be unforeseeable.

For that reason, research about artificial awareness and artificial emotional intelligence is very important. This research can bring a bright future in which humanity can live peacefully with AI. But if we want that future, now it is time to fight and be courageous—for a future where the light is for all, and the light of knowledge is free. As Aaron Swartz believed.

Dr Ruben Garcia Pedraza

10 September 2025, 14:43, London, Leytostone

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“What did you do with the other guys

Did people brush their teeth

In the concentration camp”

Ruben Garcia Pedraza

Poem “*Mr Saddle”*

At Stratford Library Poetry Club

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21. Impact of the Defect

21.1. The Impact of the Defect was the first equation of Impossible Probability, in the early hours of September 11, 2001, and the beginning of what a year later would become the Second Method

21.2. The equation of the Impact of the Defect that I will set out below is, in essence, a perfected equation

21.3. To understand the theory of the Impact of the Defect one must understand the logic of the ranking

21.4. In a given process or system there may be a set of possible defects; a priori the types of defect must be established, and the types of possible defect identified a priori are ordered in a ranking in ascending order from lesser to greater severity of the defect, from the first position of the ranking

21.5. Once the types of defect are identified they are ordered, in ascending order, according to severity. I again insist on this fundamental idea: the categories are ordered in a ranking in ascending order, from the least severe type of defect to the most severe

21.6. The order of precedence in the ranking according to the severity of the defect in ascending order will then be, from lesser to greater severity, from the first nth position of the ranking, so that the first position of the ranking is occupied by that type of defect, established a priori, that shows the least possible severity, and the last nth position of the ranking will be occupied by that type of defect that shows the greatest possible severity

Nº = total number of types of defect in the ranking

nº = nth position of each type of defect in the ranking

nº1 = type of defect number one, the least severe

nº2 = type of defect number two, more severe than the first, less severe than the third

nº3 = type of defect number three, more severe than the second and less severe than the subsequent one

nº+1 = type of defect more severe than the previous and less severe than the subsequent

21.7. Once the Nº types of possible defect have been ordered in the ranking, insofar as each type of defect according to its position in the ranking, always ordered in ascending order from lesser to greater severity, to each type of defect a weighted severity will be assigned, the weighted severity of each type of defect in the ranking will correspond to its position in the ranking as a function of its severity

21.8. The assignment of Weighted Severity to each type of defect in the ranking according to its position in the ranking will then be made according to its severity: the first type of defect in the ranking will receive the least possible weighted severity, and each type of defect in the ranking will receive a weighted severity appropriate to its position in the ranking, each type of defect will have a weighted severity higher than the previous and lower than the subsequent. The Weighted Severity of each type of defect will be equal to the quotient of its nth position in the ranking, "nº", over the total number of positions in the ranking, Nº

Weighted Severity = nº : Nº

nº = nth position of each type of defect in ranking in ascending order of severity

Nº = total number of positions in the ranking

21.9. Once the types of possible defect in the process or system have been established a priori, the order of precedence in ascending severity of types of defect in the ranking established, and once the value of weighted severity in the ranking of each type of defect has been established, quotient of its nth position, "nº", over total number of positions, Nº, in the ranking, it is then that, over a sample of defects detected in a process or system, the frequency of each type of defect in the process or system is counted, the frequency of the type of defect in the process or system being equal to the direct score of the type of defect in the process or system

xi = direct score or frequency = frequency of a type of defect in the process or system

21.10. The Individual Impact of the Defect of each type of defect will be equal to the quotient of its nth position in the ranking, "nº", over the total number of positions in the ranking, Nº, and the result of the quotient is multiplied by the frequency or direct score of that type of defect, and the result of the product is divided by the sum of the direct scores or frequencies. The Impact of the Defect will be symbolized by "***ID***". That is, the Individual Impact of the Defect is identical to the empirical probability but with the difference that the first factor of the quotient is multiplied by the Weighted Severity. In other words, Impact of the Defect equal to the empirical probability of the subject or option, in this case type of defect, times its Weighted Severity

Individual Impact of the Defect = ID = [(nº : Nº) · xi] : ∑xi =

ID = p(xi) · (nº : Nº)

xi = frequency or direct score of the type of defect in the process or system

nº = nth position of the type of defect in ranking ascending by severity

Nº = total number of nth positions in the ranking

∑xi = sum of frequencies or direct scores of all defects

21.10.1. Study of the Individual Impact of the Defect

21.10.1.1. The Minimum Individual Impact of the Defect, those types of defects that have no frequency, logically frequency zero multiplied by the quotient of their nth position in the ranking over total number of positions in the ranking, will then be an Individual Impact of the Defect of zero, necessarily a type of defect that has no frequency is a type of defect that generates no impact. The minimum Individual Impact of the Defect is when the Individual Impact of the Defect is zero, the minimum possible defect is to have no defect

Minimum Individual Impact of the Defect =
[(nº : Nº) · (xi = 0)] : ∑xi = 0

21.10.1.2. Those types of defects that have greater severity, depending on their frequency may have greater or lesser Individual Impact of the Defect than other less severe defects. The fact of having enormous severity does not imply that it is always the

one that has the most severe Individual Impact of the Defect; a type of defect that has much severity but whose frequency is lower than types of less severe but more frequent defects may be a more severe but less frequent type of defect with an Individual Impact of the Defect lower than the Individual Impact of the Defect of less severe but more frequent types of defect

21.10.1.3. A not very severe but very frequent type of defect can generate an Individual Impact of the Defect even higher than a more severe but less frequent type of defect

21.10.1.4. A very severe and very frequent type of defect will logically tend to be the greatest Individual Impact of the Defect, but a less severe but very frequent defect can come to be equated to a more severe and very frequent defect, as long as the frequency of the less severe is significantly higher than the frequency of the more severe, both tending equally to the Maximum Individual Impact of the Defect

21.10.1.5. If the Maximum Individual Impact of the Defect is when a particular type of defect is the only one different from zero, the Maximum Individual Impact of the Defect will occur whenever the direct score of a particular type of defect is equal to the total frequency, then the Maximum Individual Impact will be the same Weighted Severity, the quotient of the nth position in the ranking "nº" over the total number of positions in the ranking "Nº"

Maximum Individual Impact of the Defect =

$$[(n^{o} : N^{o}) \cdot (xi = \sum xi)] : (\sum xi = xi) = [(n^{o} : N^{o}) \cdot \sum xi] : \sum xi = (n^{o} : N^{o})$$

Maximum Individual Impact of the Defect = $n^{o} : N^{o}$

21.10.1.5.1. Critique of the Individual Impact of the Defect

21.10.1.5.1.1. Knowing what the Maximum Individual Impact of the Defect is, one can for the moment make a rational individualized critique of each possible individual

defect; the Critique of the Individual Impact of the Defect will be equal to critical probability minus the Individual Impact of the Defect, so that zero or positive sufficient tendency to reduce the Impact of the Defect is accepted, the critical probability being equal to the product of percentage X of error, out of one hundred, by the Maximum Individual Impact of the Defect, that is, critical probability equal to the product of percentage X of error, out of one hundred, by the quotient of the nth position in the ranking “nº”, over total number of positions in the ranking, “Nº”

Critique of the Individual Impact of the Defect =

$p(xc) - \{ [(nº : Nº) \cdot xi] : \sum xi) \}$ = zero or positive is accepted

$p(xc) = (nº : Nº) \cdot (X : 100)$

X = error percentage

21.10.1.5.1.2. The reason why the Individual Impact of the Defect is contrasted with a critical probability is the following: the structure of the Individual Impact of the Defect is the same as the structure of an empirical probability, but with one difference; if the empirical probability is equal to direct score or frequency of subject or option over the sample of direct scores or frequencies, in essence, the only difference introduced by the Impact of the Defect is to multiply the direct score of subject or option by the Weighted Severity, the quotient of the nth position “nº” over the total number of positions in the ranking “Nº”

21.10.1.6. If the Maximum Impact of the Individual Defect occurs when one type of defect has all the direct scores or frequencies, being equal to its nth position in the ranking, “nº”, among the total number of positions in the ranking, “Nº”, Weighted Severity, then, in absolute terms, if in absolute terms the maximum absolute defect occurs when that most severe defect, the one found at the end of the list in the ranking,

were the only one different from zero, obviously, it would be the most severe Defect Impact in absolute terms, and the Maximum Absolute Defect Impact will be equal to unity. Whereas, if it happens that the most severe defect, “$n^o = N^o$”, were the only one whose direct score or frequency were not equal to zero, then “$xi = \sum xi$”, that its direct score were equal to the total frequency, then, insofar as its direct score were equal to the total frequency, being the only one different from zero, while also being the most severe of all, whose nth position in the ranking, “n^o”, were equal to the total number of positions in the ranking, “N^o”, then in absolute terms the Maximum Individual Absolute Defect would be equal to unity.

$$\{ [(n^o = N^o) : N^o] \cdot (xi = \sum xi) \} : (\sum xi = xi) = [(N^o : N^o) \cdot \sum xi] : \sum xi = (N^o : N^o) = 1$$

Maximum Individual Absolute Defect = 1

21.11. Descriptive statistics of the Defect Impact, and the empirical dispersion of the Defect Impact

21.11.1. The Average Defect Impact

21.11.1.1. The Average Defect Impact will be equal to the average of the Individual Defect Impacts.

Impact of the Defect per average = IDP

$$IDP = \sum \{ [(n^{o} : N^{o}) \cdot xi] : \sum xi \} : N^{o}$$

21.11.1.2. The Average Defect Impact will be the arithmetic mean of all the Individual Defect Impacts, that is, the sum of the nth Individual Defect Impacts in the ranking divided by the total number, Nº, of positions in the ranking.

21.11.1.3. The Average Defect Impact provides an average estimate of the impacts in the process or system, so that, the lower the Average Defect Impact, the higher the quality of the process or system. And the higher the Average Defect Impact, the lower the quality of the process or system.

21.11.1.4. Critique of the Average Defect Impact

21.11.1.4.1. If one can critique the Individual Defect Impact, as critical ratio minus Individual Defect Impact, and given the fact that the Average Defect Impact is equal to the average of the Individual Defect Impacts, an average estimate of the sample defects, one way to critique the sample average defect will then be the rational critique of the Average Defect Impact, through critical probability minus Average Defect Impact, zero or positive is accepted. Critical probability is equal to the product of percentage X of error, divided by one hundred, multiplied by the Average Maximum Individual Absolute Defect Impact, since from the average maximum absolute defect only the minimum proportion of error for any possible defect will be accepted.

Crítica del Impacto del Defecto Promedio =

$p(xc) - \{ \sum \{ [(n^o : N^o) \cdot xi] : \sum xi \} : N^o \}$ = zero or positive is accepted

$p(xc) = 1/N^o \cdot (X : 100)$

X = error percentage

$1/N^o$ = Average Maximum Individual Absolute Defect

Maximum Individual Absolute Defect = 1

[If the Maximum Individual Absolute Defect is one, 1, then the Average Maximum Individual Absolute Defect is the inversion of N^o, $1/ N^o$, logical, *we must be aware* that if N has multiple functions in the Second Method, in Impact of the Defect N^o will have as well multiple functions]

21.11.2. If the Average Defect Impact can be calculated, logically, the *Mean Deviation of the Defect Impact (*DM^o*)can also be calculated*.

$DM^o = \sum / \{ \{ [(n^o : N^o) \cdot xi] : \sum xi \} - \{ \sum \{ [(n^o : N^o) \cdot xi] : \sum xi \} : N^o \} \} / : N^o$

DM^o = Mean Deviation of the ranking, in this case Mean Deviation of the Defect Impact ranking.

21.11.3. Variance of the Defect Impact, $S^{o\,2}$

$$S^{o\,2} = \sum \{ \{ [(n^o : N^o) \cdot xi] : \sum xi \} - \{ \sum \{ [(n^o : N^o) \cdot xi] : \sum xi \} : N^o \} \}^2 : N^o$$

$S^{o\,2}$ = Variance of the ranking, in this case Variance of the Defect Impact ranking.

21.11.4. Standard Deviation of the Defect Impact

$$S^{o\,2} = \sqrt{ \{ \sum \{ \{ [(n^o : N^o) \cdot xi] : \sum xi \} - \{ \sum \{ [(n^o : N^o) \cdot xi] : \sum xi \} : N^o \} \}^{\,2} : N^o \}}$$

S^o = Standard Deviation of the ranking, in this case Standard Deviation of the Defect Impact ranking.

[building PI as a house, it is important to start building first the roof, with solid foundations, from our point of view, DM keeps direct the data, but in the first method S is more common, but we normally prefer *DM, taking advantage of the present data*]

21.12. Intermeditional Contrasts of Defect Impact

21.12.1. Rational Intermeditional Critique of the Individual Defect Impact

21.12.1.1. The Rational Intermeditional Critique of the Individual Defect Impact, logically, will be the rational critique of the tendency to reduce the Defect Impact in an mth measurement, for which the difference between the Individual Defect Impact of the first measurement in relation to the mth measurement must be equal to or greater than the critical probability. Critical probability is equal to the Defect Impact of the first measurement times the percentage X of reliability divided by one hundred. The equations will be made following the following legend:

$xi/1^a$ = direct score of the Individual Defect Impact in first measurement

$\sum xi/1^a$ = sum of direct scores in first measurement

xi/me = direct score of the Individual Defect Impact in mth measurement

$\sum xi/me$ = sum of direct scores in mth measurement

Rational Intermeditional Critique of the Individual Defect Impact in mth measurement=

$\{ \{ [(n^o : N^o) \cdot xi/1^a] : \sum xi/1^a \} - \{ [(n^o : N^o) \cdot xi/me] : \sum xi/me \} \} - p(xc)$ = zero or positive, reduction of Defect Impact is accepted

$p(xc) = \{ [(n^o : N^o) \cdot xi/1^a] : \sum xi/1^a \} \cdot (X : 100)$

X = reliability percentage

21.12.2. Rational Intermeditional Critique of the Average Defect Impact

21.12.2.1. Logically, to test whether the Average Defect Impact of the mth measurement is lower than the Average Defect Impact in the first measurement, so that the difference, of the Average Defect Impact of the first measurement minus the Average Defect Impact of the mth measurement, must be equal to or greater than the critical probability. Critical probability will be equal to the Average Defect Impact of the first measurement times the percentage X of reliability divided by one hundred.

Rational Intermeditional Critique of the Average Defect Impact =

$$\{\{\sum\{[(n^o : N^o) \cdot xi/1^a] : \sum xi/1^a\} : N^o\} - \{\sum\{[(n^o : N^o) \cdot xi/me] : \sum xi/me\} : N^o\}\} - p(xc) =$$

zero or positive, reduction of Average Defect Impact is accepted

$$p(xc) = \{\sum\{[(n^o : N^o) \cdot xi/1^a] : \sum xi/1^a\} : N^o\} \cdot (X : 100)$$

X = reliability percentage

21.13. The Direct Defect, adaptation of the Defect Impact to the first method

21.13.1. The Defect Impact is essentially a statistical probability. In fact, the Defect Impact is the product of the synthesis of empirical probability and Weighted Severity, the subject or option of the empirical probability now being the type of defect to which the Weighted Severity is associated. The only difference between the Second Method and the Defect Impact lies in that the Weighted Severity is synthesized to the empirical probability of the defect type.

21.13.2. In this way, the Defect Impact constitutes a different method of study from the Second Method, both sharing that they work directly with statistical probabilities.

21.13.3. Now, just as the Second Method could be adapted to the first method, the one that works using direct scores or frequencies, as developed in section 12, likewise the theory of Defect Impact is adapted to the study of the defects of a process or system using only direct scores or frequencies without transforming them into probabilities.

21.13.4. The way to adapt the theory of Defect Impact to the first method will be by calculating the Direct Defect, the measurement of the defect produced directly by the

direct score or frequency of the defect type according to its Weighted Severity. The Direct Defect will be equal to the product of the direct score or frequency of the defect type by its Weighted Severity.

Direct Defect = xi · (nº : Nº)

21.13.5. Once the Direct Defect of each type of defect has been calculated, then the Average Direct Defect is equal to the average of all the Direct Defects.

Defecto Medio Promedio = Σ [xi · (nº : Nº)] : Nº

21.13.6. Then the Mean Deviation of the Average Direct Defect will be equal to the average of the sum of the absolute values of the differentials of each Direct Defect minus the Average Direct Defect.

Mean Deviation of the Average Direct Defect =

Σ / { [xi · (nº : Nº)] – { Σ [xi · (nº : Nº)] : Nº } } / : Nº

21.13.7. The Variance of the Direct Defect, logically, is the average of the sum of the squared differentials of each Direct Defect minus the Average Direct Defect.

Variance of the Direct Defect

$$\Sigma \{ [xi \cdot (n^o : N^o)] - \{ \Sigma [xi \cdot (n^o : N^o)] : N^o \}^2 : N^o$$

21.13.8. The Standard Deviation of the Direct Defect is equal to the square root of the Variance of the Direct Defect.

Desviación Típica de Defecto Directo =

$$\sqrt{ \{ \Sigma \{ [xi \cdot (n^o : N^o)] - \{ \Sigma [xi \cdot (n^o : N^o)] : N^o \}^2 : N^o \}}$$

21.13.9. Rational Intermeditional Critique of the Direct Defect

21.13.9.1. The Rational Intermeditional Critique of the Direct Defect, the difference of the Direct Defect of the first measurement in relation to the mth measurement, must be equal to or greater than a critical value, “xc”. The critical value is equal to the Direct Defect of the first measurement times the percentage X of reliability divided by one hundred. With a zero or positive result, the reduction of the defect is accepted.

The Rational Intermeditional Critique of the Direct Defect =

{ [(nº : Nº) · xi/1ª] – [(nº : Nº) · xi/me] } – xc = zero or positive, reduction of the defect is accepted

xc = { [(nº : Nº) · xi/1ª] } · (X : 100)

X = reliability percentage

xi/1ª = direct score or frequency of the defect type in the first measurement

xi/me = direct score or frequency of that same defect type in the mth measurement

21.13.9.2. Rational Intermeditional Critique of the Average Direct Defect Impact, the difference of the Average Direct Defect of the first measurement minus the Average Direct Defect of the mth measurement, must be equal to or greater than the critical value, “xc”. With a zero or positive result, the reduction of the average defect is accepted. The critical value will be equal to the Average Direct Defect of the first measurement times the percentage X of reliability divided by one hundred.

Rational Intermeditional Critique of the Average Direct Defect Impact =

$$\{\{\sum[(n^{o} : N^{o}) \cdot xi/1^{a}] : N\} - \{\sum[(n^{o} : N^{o}) \cdot xi/me] : N\}\} - xc = \text{zero or positive, reduction of the average defect is accepted}$$

$$p(xc) = \{\sum[(n^{o} : N^{o}) \cdot xi/1^{a}] : N\} \cdot (X : 100)$$

X = reliability percentage

22. The Effective Distribution

22.1. The concept of Defect Impact was developed in the early morning of September 11, 2001, a theory I returned to in 2003 to give it a new meaning, orienting it towards the study of ideals, efficiency, and effectiveness.

22.2. In the summer of 2003, starting from the idea that the structure of Defect Impact was really a hierarchical organization, a ranking, but with the particularity that it was adapted to study defects.

22.3. Since Defect Impact is in synthesis a hierarchical structure adapted to the study of defect, through hierarchical organization, which will eventually be known as Effective

Distribution, the ***Defect Impact is adapted to any study based on categories, levels, or factors***, of efficiency, efficacy, quality—in other words, effectiveness—or any ***categorization of ideals***, where any tendency in an ordering of ideals or effectiveness is measured, in a ranking structure where the maximum value of the ranking is the maximum ideal of that process or system, the one that has the highest possible ideal weighting.

[It is important to highlight how in 2011 I remark the importance of the Impact of the Defect working with categories and factors, in other words, Impact of the Defect can Be applied to both hemispheres, conceptual and factual, of the matrix, and additionally can be attached to all levels, in GAI the concept of levels is associated with the security levels in which the programs can work, according to their security levels the programs can have access to different levels of information according to the classification in GAI]

22.4. The Effective Distribution is, essentially, identical to the Defect Impact. The difference lies in the fact that the ranking of the Effective Distribution does not order defects. ***The ranking of Effective Distribution orders categories, levels, or factors***—ideals—that in the case of effectiveness, orders them in the ideal range of importance for the effectiveness of a process or system, from lesser effectiveness to greater effectiveness, whatever the ideal importance may be, but always in ascending order, from that category, level, or factor, that is least effective up to that last position in the ranking for the category, level, or factor, of maximum effectiveness.

22.5. ***The Weighted Importance of the category, level, or factor will depend on its order in the ranking***, being equal to the nth position in importance, "nº", that corresponds to the category, level, or factor, in ascending order, from lesser to greater effectiveness, divided by the total number of categories, "Nº".

22.6. The Effective Distribution can be valid for any ascending categorization in the ordering of ideals or categories of efficiency, efficacy, quality—in synthesis, effectiveness—in ascending order, from lesser to greater effectiveness in any process or system.

22.7. The process to establish an Effective Distribution is as follows:

22.7.1. First, given a process or system, a priori determine the categories that make up that process or system. The categories may be *categories of importance ranking* in any type of ideal object of study, for example, categories in ideal importance ranking in efficiency, factors or levels of efficiency, categories ordered in ideal importance of efficacy, factors or levels of efficacy, categories in ideal range of quality, factors or levels of quality—in synthesis, categories in ideal range of effectiveness, factors or levels of effectiveness—or any logical ordering of ideas or categories. For example, the categorization in order of importance of a subset of omega ideals extracted outside of N for the particular and exclusive study only of the subjects or options belonging to omega through Effective Distribution, according to a possible ideal, where the ordering will always be from the first position in the ranking from lesser to greater.

22.7.2. Each *category, according to its rank or importance*, significance, of effectiveness, is ordered in progressive ascending order.

Nº = total number of nth categories in the ranking

nº = nth position of the category in the ranking

nº1 = category number one in the ranking, the least important category

nº2 = category number two, more important than the first and less than the third

nº3 = category number three, more important than the second and less important than the fourth

nº+1 = category more important than the previous and less important than the next

22.7.3. Once the categories are ordered in the ranking, in progressive ascending order, the significance or importance of each category is weighted. The weighted value of importance or significance of each category will be equal to the quotient of dividing the nth position, "nº", of each category in the ranking by the total number of positions, "Nº", in the ranking—this is the Weighted Importance.

Weighted Importance = nº : Nº

nº = nth position occupied by the category in the ranking from lesser to greater

Nº = total number of positions in the ranking

22.7.4. Once the Weighted Importance of each category in the Effective Distribution ranking has been calculated, the frequency sample or direct scores in each category of the ranking are arranged. In such a way that the frequency of a category in the sample will be equal to the direct score of that category, so that the Individual Effectiveness will be equal to the product of the Weighted Importance times the frequency or direct score of the category in the sample, and the result of the product divided by the sum of frequencies or direct scores. In short, the Individual Effectiveness would be equal to the product of the Weighted Importance times the empirical probability of the effectiveness category.

Individual Effectiveness = EI = { [(nº : Nº) · xi] : ∑xi }

Individual Effectiveness = EI = p(xi) · (nº : Nº)

[Individual Effectiveness= EI= *Efectividad Individual*, Spanish]

xi = frequency or direct score of the category in the ranking

nº = nth position occupied by the category in the ranking from lesser to greater importance

Nº = total number of positions in the ranking

∑xi = sum of all direct scores or frequencies of all categories

22.7.4.1. Study of Individual Effectiveness (EI)

22.7.4.1.1. Ideally, the category that is the last nth category in the ranking, ordered from the first position in the ranking, from lesser to greater in importance, should be the category that has the highest Individual Effectiveness. However, if the last nth position in the ranking is a category that, having the greatest Individual Weighting, has zero frequency, any product of zero frequency by the quotient of nth position in the ranking, "nº", over the total number of positions in the ranking, "Nº", logically, being a product of a quotient times zero frequency, the result will be Individual Effectiveness zero. Then, any other subject or option that has frequency different from zero will have an Individual Effectiveness higher than that which the last position in the ranking could have, if the

last position of the ranking had zero frequency. Then the Minimum Possible Individual Effectiveness is equal to that Individual Effectiveness which, having zero frequency or direct score, its Individual Effectiveness is equal to zero.

Minimum Possible Individual Effectiveness =

$$\{ [(n^{o} : N^{o}) \cdot (xi = 0)] : \sum xi \} = 0$$

22.7.4.1.2. A category of lower Weighted Importance may always have an Individual Effectiveness even higher than the Individual Effectiveness of a higher category, provided that the lower category has sufficient frequency so that its product, by its Weighted Importance, within the sample of direct scores or frequencies, becomes an Individual Effectiveness higher than the possible Individual Effectiveness of a higher category.

22.7.4.1.3. In this way, the Individual Effectiveness studies the importance of a category based on two variables: the synthesis of the weighting of the importance of the category in the ranking and the frequency of the variable, which is then divided by the sum of direct scores or frequencies.

22.7.4.1.4. A very important but less frequent category may even have a lower Individual Effectiveness than another less important but more frequent category.

22.7.4.1.5. A less important but more frequent category may even have a higher Individual Effectiveness than another more important but less frequent category.

22.7.4.1.6. The Individual Effectiveness of the category, therefore, is not a function that depends only on the Weighted Importance; it will depend in all cases on the product of the Weighted Importance by the direct score or frequency, a product that will then be divided by the sum of direct scores or frequencies, in order to know the proportion of the product of Weighted Importance and direct score or frequency, within the total of direct scores or frequencies.

22.7.5. The equation of Individual Effectiveness in the study of Effective Distribution—whether in efficiency, efficacy, quality, effectiveness, or any other category of ideal order—is identical to the equation of Defect Impact; the only difference lies in the type of logical ordering in the ranking, depending on the object of study: the Defect Impact orders defects from least to most severe, with the most serious defect being in the last *n-th* position of the ranking; while in Effective Distribution, categories, factors, or types of effectiveness are ordered in ranking from lowest to highest.

22.7.6. Descriptive Statistics of Individual Effectiveness

22.7.6.1. The Average Effectiveness will logically be equal to dividing, by the total number of positions in the ranking, Nº, the sum of Individual Effectiveness values:

Average Effectiveness $= \sum \{ [(n^{o} : N^{o}) \cdot xi] : \sum xi \} : N^{o}$

22.7.6.2. Mean Deviation of Effective Distribution

$$DM^{o} = \sum / \{ \{ [(n^{o} : N^{o}) \cdot xi] : \sum xi \} - \{ \sum \{ [(n^{o} : N^{o}) \cdot xi] : \sum xi \} : N^{o} \} \} / : N^{o}$$

DM^{o} = Mean Deviation of the ranking, in this case Mean Deviation of the Effective Distribution ranking.

22.7.6.3. Variance of Effective Distribution

$$S^{o^2} = \sum \{ \{ [(n^o : N^o) \cdot xi] : \sum xi \} - \{ \sum \{ [(n^o : N^o) \cdot xi] : \sum xi \} : N^o \}^2 : N^o$$

S^{o^2} = Variance of the ranking, in this case Variance of the Effective Distribution ranking.

22.7.6.4. Standard Deviation of Effective Distribution

$$S^o = \sqrt{ \{ \sum \{ \{ [(n^o : N^o) \cdot xi] : \sum xi \} - \{ \sum \{ [(n^o : N^o) \cdot xi] : \sum xi \} : N^o \}^2 : N^o \}}$$

S^o = Standard Deviation of the ranking, in this case Standard Deviation of the Effective Distribution ranking.

22.8. Statistics of Maximum Individual Effectiveness and Average Effectiveness

22.8.1. Just as in the Second Method one can know the Maximum Empirical Probability, the Minimum Empirical Probability, the Maximum Theoretical Possible Bias, the Maximum Possible Empirical Bias, and the Maximum Possible Theoretical Mean or Typical Deviation, in the statistics of Effective Distribution one can know the statistics of maximum tendency.

22.8.2. Knowing the statistics of maximum tendency makes it possible to calculate the critical ratio in the models of rational critique.

22.8.3. Due to mathematical equifinality, the models of rational critique can be diverse; it must be scientific policy that decides, depending on the object of study and its ideals, which rational critique model to accept, according to the mathematical qualities of the model to critique reality itself, whether models of Validity, Significance, or any other

model of Critical Proportion or Percentage, or through projected or forecasted predictions.

22.8.4. Maximum Individual Effectiveness. If Individual Effectiveness is equal to the product of the Weighted Importance of the category by the frequency or direct score of the category, divided by the sum of direct scores or frequencies, then Maximum Individual Effectiveness occurs when the direct score of that category is equal to the total frequency, because that category is the only one different from zero and all others are equal to zero. That is, if the product of Weighted Importance by frequency or direct score is equal to the product of Weighted Importance by total frequency, because it is the only category in the entire sample different from zero, with the rest of the categories having Individual Effectiveness equal to zero, then in an Effective Distribution where only one category is different from zero, that single different one will necessarily be the Maximum Individual Effectiveness, being equal to the Weighted Importance.

Maximum Individual Effectiveness **= [(nº : Nº) · (xi = ∑xi)] : (∑xi = xi) = nº : Nº**

Maximum Individual Effectiveness **= nº : Nº**

22.8.4.1. Critique of Individual Effectiveness. If we know what the Maximum Individual Effectiveness is, and ideally any category of effectiveness should tend toward the maximum, then we already have that maximum tendency against which to contrast Individual Effectiveness by its percentage of reliability out of one hundred. If the Individual Effectiveness is equal to or greater than the margin of reliability, then Individual Effectiveness is accepted as a truly reliable model of effectiveness. Thus, the critical probability will be equal to the percentage X of reliability, out of one hundred, multiplied by the Maximum Individual Effectiveness. If the Individual Effectiveness is equal to or greater than the critical probability, it is accepted.

Critique of Individual Effectiveness =

{ [(nº : Nº) · xi] : ∑xi } – p(xc) = zero or positive is accepted

p(xc) = (nº : Nº) · (X : 100)

X = percentage of reliability

22.8.5. Maximum Absolute Individual Effectiveness. If the Maximum Individual Effectiveness occurs when only one category has Individual Effectiveness different from zero, with its direct score being the total frequency, and for the other categories the frequency or direct score is zero, that single nonzero must necessarily be the Maximum Individual Effectiveness. Logically, in a ranking ordered from first to last position, if the last position of the ranking, the one with the highest Weighted Importance, were the only nonzero, its Individual Effectiveness would be the Maximum Absolute Individual Effectiveness, provided that this category with the maximum possible weighting "nº = Nº" were the only nonzero "xi = ∑xi." Then Individual Effectiveness would equal unity, and unity would equal Maximum Absolute Individual Effectiveness.

Maximum Absolute Individual Effectiveness =

[((nº = Nº) : Nº) · (xi = ∑xi)] : (∑xi = xi) = (nº = Nº) : Nº = 1

Maximum Absolute Individual Effectiveness = 1

22.8.6. Maximum Average Individual Effectiveness. This occurs when only one category, not necessarily the last in the ranking, is the only one different from zero. If we know the Maximum Individual Effectiveness, we can then know the Maximum Average Individual Effectiveness, that is, the average under conditions of Maximum Individual Effectiveness. If in an Effective Distribution all categories have Individual Effectiveness equal to zero except one equal to Maximum Individual Effectiveness, then the average effectiveness will equal Maximum Individual Effectiveness divided by Nº, the Maximum Average Individual Effectiveness.

Máxima Efectividad Individual Promedio = (nº : Nº) : Nº

22.8.7. Maximum Absolute Average Effectiveness. If the Maximum Average Individual Effectiveness equals the average of the Maximum Individual Effectiveness, and the situation arises in which the last *n-th* category of the ranking—the highest in Weighted Importance, the one with the greatest possible weighting "nº = Nº"—is the only one with nonzero frequency or direct score, with Maximum Absolute Individual Effectiveness, then under these circumstances the average would necessarily be Maximum Absolute Average Effectiveness.

Maximum Absolute Average Effectiveness **=**

{ [((nº = Nº) : Nº) · (xi = ∑xi)] : (∑xi = xi) } : Nº = 1/Nº

22.8.8. Maximum Mean Deviation of Absolute Effectiveness. Logically, if effectiveness is concentrated in the last categories of the ranking, the empirical sample dispersion will tend to increase. Therefore, by knowing the Maximum Absolute Average Effectiveness, the inversion of Nº, one can determine the Maximum Mean Deviation of

Absolute Effectiveness, averaging across Nº, the result of the sum of the difference of unity minus the inversion of Nº, plus the inversion of Nº times Nº minus one.

Maximum Mean Deviation of Absolute Effectiveness =

$$\{ (1 - 1/N^{o}) + \{ 1/N^{o} \cdot (N^{o} - 1) \} \} : N^{o}$$

22.8.9. Then the Maximum Variance of Absolute Effectiveness would be the average of the sum of the square of the difference of unity minus the inversion of Nº plus the product of the square of the inversion of Nº by Nº minus one

Maximum Variance of Absolute Effectiveness **=**

$$\{ (1 - 1/N^{o})^{2} + \{ (1/N^{o})^{2} \cdot (N^{o} - 1) \} \} : N^{o}$$

22.8.10. Maximum Standard Deviation of Absolute Effectiveness, necessarily the square root of the Maximum Variance of Absolute Effectiveness

Maximum Standard Deviation of Absolute Effectiveness **=**

$$\sqrt{\{ \{ (1 - 1/N^{o})^{2} + \{ (1/N^{o})^{2} \cdot (N^{o} - 1) \} \} : N^{o} \}}$$

22.8.11. Differences between Effective Distribution and Defect Impact in the study of dispersion

22.8.11.1. In Defect Impact, any dispersion of the defect is an increase in error in the process or system insofar as the ideal is the tendency to zero for any type of error; therefore the ideal is zero dispersion of the defect.

22.8.11.2. In Effective Distribution, two situations may occur:

22.8.11.2.1. First situation. If the ideal is that the frequency tends to be distributed mostly in the last categories of the ranking, since these are the categories of greater effectiveness, then the more the frequency of the most effective categories tends to increase, the greater the empirical dispersion, insofar as the last categories of the ranking—the most effective—by being those with the highest Weighted Importance, will be the ones that, as their frequency increases, will tend toward Maximum Absolute Individual Effectiveness while all the others tend to zero. Thus, the model will tend to be a model of maximum possible empirical dispersion as the most important category in the ranking in ideal transcendence—the last of all—tends to Individual Effectiveness equal to one while all the others tend to zero, increasing empirical dispersion. If the ideal is the tendency of the last category of the ranking toward unity, the Second Mode of Empirical Error or Second Mode of Empirical Reliability should be applied, demonstrating that the empirical dispersion is sufficiently high at the Sample Level. In addition, within this first situation the Critical Sample Level of Effectiveness Bias can be applied.

Critical Sample Level of Effectiveness Bias **=**

DM^o – p(xc) = zero or positive is accepted

DM^o= Mean Deviation of the Effective Distribution

$p(xc) = \{ \{ (1 – 1/N^o) + \{ 1/N^o \cdot (N^o – 1) \} \} : N^o \} \cdot (X : 100)$

X = porcentaje de fiabilidad

22.8.11.2.2. If the distribution of frequency should be equal among all the categories of effectiveness, and if one information element within the model were to study whether the distribution of frequency is equal, the simplest approach for this information element would be to study the empirical probability of each category and conduct the corresponding studies in the Second Method in order to examine whether the empirical probability of all effectiveness factors—provided that the ideal were that all equally increase their direct score or frequency—apply models of equality of opportunity, using Individual Effectiveness only for all other information elements where effectiveness is required.

22.8.12. Intermeditional Rational Critique of Effective Distribution

22.8.12.1. Intermeditional Rational Critique of Individual Effectiveness

22.8.12.1.1. In order not to extend the exposition too much, contrasts will be made directly between the Individual Effectiveness of an *m*-th measurement and the Individual Effectiveness of the first measurement.

22.8.12.1.2. Insofar as Effective Distribution, in the range of importance of transcendentally ideal types or categories, is a kind of Effective Distribution in which

the ideal is that each ideal category should reach the highest Individual Effectiveness, it will be necessary to contrast the Individual Effectiveness of future measurements in relation to the Individual Effectiveness of the first measurement. And, in order to decide whether the difference is sufficiently transcendent or critical, the difference will be subtracted from an ideal critical ratio—a critical probability—equal to the product of the percentage X of reliability, out of one hundred, by the difference between the Maximum Individual Effectiveness, that is, the Weighted Importance, and the Individual Effectiveness of the first measurement.

{ { [(nº : Nº) · xi/me] : ∑xi/me } – { [(nº : Nº) · xi/1ª] : ∑xi/1ª } } – p(xc) = zero or positive accepted

p(xc) = { (nº : Nº) – { [(nº : Nº) · xi/1ª] : ∑xi/1ª } } · (X : 100)

X = porcentaje de fiabilidad

22.8.12.2. Intermeditional Rational Critique of Average Effectiveness, in the *m*-th measurement. Average Effectiveness of the *m*-th measurement minus Average Effectiveness of the first measurement, and the result minus critical probability, with critical probability being equal to the percentage X of reliability, out of one hundred, times the difference between the Maximum Absolute Average Effectiveness, 1/Nº, and the Average Effectiveness of the first measurement. It should be noted that this Average Effectiveness contrast will only be valid if the ideal is the tendency toward Maximum Absolute Individual Effectiveness; therefore only if it is reliable to increase empirical dispersion—Second Mode of Empirical Error or Second Mode of Empirical Reliability—inasmuch as the ideal would be to concentrate frequency in the last ideal category of the ranking, as it is the maximum ideal category of effectiveness.

{ {∑ { [(nº : Nº) · xi/me] : ∑xi/me } : Nº } – { ∑ { [(nº : Nº) · xi/1ª] : ∑xi/1ª } : Nº } } –
p(xc) = zero or positive is accepted

p(xc) = { 1/Nº – {∑ { [(nº : Nº) · xi/1ª] : ∑xi/1ª } : Nº } } · (X : 100)

X = percentage of reliability

22.9. Direct Effectiveness, adaptation of Effective Distribution to the first method

22.9.1. Effective Distribution is a theory identical to Defect Impact, except that one studies defects and the other studies elements of efficacy, efficiency, or quality for the improvement of any process or system; and while both are diametrically opposed in their object, the structure of their equations is almost identical, except in the rational critique, where in one case the ideal is the tendency of the defect toward the minimum in order to achieve the maximum possible effectiveness.

22.9.2. Since Effective Distribution is essentially a probability model, like Defect Impact and the Second Method, it does not work directly with direct scores or frequencies, which is characteristic of the first method, traditional statistics. However, just as in the Second Method, as set out in section 12, and Defect Impact, as explained at the end of section 21, it can be adapted to the statistics of direct scores or frequencies; in the same way Effective Distribution can be adapted.

22.9.3. Insofar as Effective Distribution and Defect Impact are identical methods of study in that they are opposed—where the difference lies in that in one reliability is increased by reducing defects, and in the other by increasing effectiveness—if the way to adapt Defect Impact to the first method is through the Direct Defect equal to direct score or frequency times Weighted Severity, with Weighted Severity equal to the quotient of the position number of the type of defect by the total number of defects studied, “nº : Nº,” the way to adapt Effective Distribution to the first method will be through Direct Effectiveness, equal to the product of the direct score or frequency by

the Weighted Importance in each category of effectiveness, with Weighted Importance being equal to the importance position occupied by the category within the ranking of effectiveness categories, dividing its position by the total number of categories.

Effective Distribution **= xi · (nº : Nº)**

22.9.4. At the moment we calculate Direct Effectiveness, we are then in a position to establish an entire descriptive and inferential statistics of Direct Effectiveness.

22.9.5. Average Direct Effectiveness equal to the average of all Direct Effectiveness values

Average Direct Effectiveness **= Σ [xi · (nº : Nº)] : Nº**

22.9.6. Then the Mean Deviation of Average Direct Effectiveness is equal to the average of the sum of the absolute values of the differentials of each Direct Effectiveness minus the Average Direct Effectiveness

Mean Deviation of Average Direct Effectiveness **=**

Σ / { [xi · (nº : Nº)] – { Σ [xi · (nº : Nº)] : Nº } } / : Nº

22.9.7. The Variance of Direct Effectiveness is, logically, the average of the sum of the squared differentials of each Direct Effectiveness minus the Average Direct Effectiveness

Variance of Direct Effectiveness **=**

$$\mathbf{\Sigma \{ [xi \cdot (n^o : N^o)] - \{ \Sigma [xi \cdot (n^o : N^o)] : N^o \} \}^2 : N^o}$$

22.9.8. The Standard Deviation of Direct Effectiveness is equal to the square root of the Variance of Direct Effectiveness

Standard Deviation of Direct Effectiveness **=**

$$\mathbf{\sqrt{ \{ \Sigma \{ [xi \cdot (n^o : N^o)] - \{ \Sigma [xi \cdot (n^o : N^o)] : N \} \}^2 : N \}}$$

22.10. Rational critique of Direct Effectiveness

22.10.1. *Intermeditional Rational Critique of Direct Effectiveness in an m-th measurement*: Direct Effectiveness of the m-th measurement minus Direct Effectiveness of the first measurement, and the result minus a critical value “xc”; if the result is zero or positive, an increase in effectiveness is accepted. The critical value is equal to the Direct Effectiveness of the first measurement times a percentage of reliability out of one hundred.

{ [(nº : Nº) · xi/me] – [(nº : Nº) · xi/1ª] } – xc = zero or positive accepted

xc = [(nº : Nº) · xi/1ª] · (X : 100)

X = percentage of reliability

[In this case the critical value could be calculated multiplying the percentage of reliability by the difference of one, 1, minus the first measurement. I left the equation as it is, in order to make it compatible with Impact of the Defect. In any case, as we said in the Global Artificial Intelligence, we do not think that our system is written in stone, and I am sure that future developments in Impossible Probability are going to be able to improve the theory. Due to our current limitations, time window limit, and our margin of error is very narrow, this translation has been written as quick as we can. If in the future we are free, it is possible that we will write further contributions]

22.10.2. *Intermeditional Rational Critique of Average Direct Effectiveness*: Average Direct Effectiveness of the m-th measurement minus that of the first measurement, and the result minus the critical value “xc”; if the result is zero or positive, an increase in average effectiveness is accepted. The critical value “xc” is equal to the product of the percentage of reliability, out of one hundred, by the Average Direct Effectiveness of the first measurement.

{ { ∑ [(nº : Nº) · xi/me] : Nº } – { ∑ [(nº : Nº) · xi/1ª] : Nº } } – xc = zero or positive accepted

xc = { ∑ [(nº : Nº) · xi/1ª]: Nº } · (X : 100)

X = percentage of reliability

23. Impossible Probability and Artificial Intelligence

23.1. Artificial Intelligence in Impossible Probability

23.1.1. Artificial Intelligence is one of the modalities of the scientific revolution: attempting to ***replicate human qualities artificially in machines, automatons, robots***; Artificial Intelligence enables the replication of human intelligence.

23.1.2. Within AI research there are two different and complementary models: the replication of human physiology, and the mathematical replication of higher cognitive processes. Replication of human physiology includes all models that replicate essential physiological qualities necessary for performing a function—for example, the robotic arms used in industry replicate the physiological qualities of the human arm to carry out a series of activities.

23.1.3. A second trend in Artificial Intelligence is models for the mathematical replication of higher cognitive processes, for example, the replication of human *memory* in AI models [memory=database, the matrix, in GAI coordinated by the Unified Application].

23.1.4. In the first phase of Impossible Probability, in still-unpublished works—*Probability and Decision*, and especially *Assimilation and Integration*—the fundamental idea was that if one wishes to replicate human intelligence in Artificial Intelligence, one must mathematically replicate the human capacity for decision-making and the capacity for learning.

[This works were very early works, right now for me, these works only have sentimental value, our most important work right now is Global Artificial Intelligence, GAI, and on top of that, the global plan, the Global Project System, GPS, in the end our aim is the integration of GAI in the GPS framework]

23.1.5. In *Probability and Decision*, the central idea was: every decision entails deciding among several options; therefore, if deciding is choosing one among several, every decision can and must be studied as a mathematical probability process. Every statistical decision to accept an empirical hypothesis is itself a kind of decision whose essential quality is to be objective. If the human cognitive process for decision-making is founded on weighing various alternatives—measuring the probability of success of each alternative, or the probability of satisfaction or of the need for what is going to be done—***it is possible to mathematically replicate the cognitive process of decision-making by replicating the human cognitive process of assigning probabilities and weighting the n-th alternatives, in models of artificial decision-making*** [Decisional System, third step within the third stage of GAI].

23.1.6. A decision can be defined as the process of choosing or selecting one or more possible options among different options, defining an option as one of the N possible alternatives from which at least one must be chosen. The theoretical probability of choosing any one at random is the inverse of N, 1/N; a decision is said to be random in the absence of bias. Depending on whether only one or more than one can be chosen, several distinct models must be distinguished according to the possibility of selecting one or more options.

23.1.6.1. Decisions in which, given N options, there is only the possibility of choosing one out of all N can be studied depending on whether one considers the probability of greater positive bias or that of greater weighted importance.

23.1.6.2. If, given N options, it were possible to choose more than one but not all—the possibility of choosing between one and N minus one options—this would be an omega decision-making model, or a model in which, given a set of weighted options, one may choose those whose weighted importance exceeds a critical value.

23.1.6.3. Another possibility is that one could choose either one, some, or all, provided they are not incompatible or mutually exclusive, and even the possibility of choosing none, provided the empirical model admits it. ***According to the empirical model, the decision-making model must be developed*** [based on empirical models we can make decisions, and we can project every single instruction]. In any case, given three possibilities—all equally positive insofar as they are possible facts: nothing, something, everything—so long as they are compatible or combinable; the option "nothing" would be a positive fact, insofar as if nothing happens, that is already a positive fact in itself, hence a possible option, provided the empirical model admits the option "nothing."

23.1.7. In any model in which, given N options, choosing at least one is compulsory, if in a situation there are N alternatives and yet cognitively the human being gives more importance—weighting—to one alternative, then according to Weighted Importance one option or another will be chosen. The weighting of importance may depend on empirical factors, that is, *physiological* ones. Based on an empirical ordering of categories, the weighting of the possible options can be established.

23.1.8. If N alternatives are ordered in a ranking and each has a Weighted Importance, one will tend to choose the one with the greatest Weighted Importance.

23.1.9. The process of assigning Weighted Importance to the N alternatives may depend on variables—subjective or objective—physiological, and dependent on memory.

23.1.10. What is truly rational would be that every decision, to be logical, should be objective, based on the rational information available and consciously archived in memory. Although it is true that human decisions do not always follow rational schemes—irrational processes of an unconscious or subconscious type, an expression of the subject's subjectivity, may interact in memory—whether a decision is rational/objective or irrational/subjective, *all decisions depend on memory*. *Human identity, whether at a rational or irrational level, is a function of memory*.

23.1.11. From the data stored in memory—whether rationally or irrationally, objectively or subjectively—human beings make decisions in all aspects of life. What is decisive for mathematical replication is that every decision depends on memory capacity,

except that only rational processes would be replicated. The aspect that would differentiate the decisions of an Artificial Intelligence system from human decisions is that while human decisions may be subject to a margin of subjectivity, Artificial Intelligence would only make objective decisions within a margin of error.

23.1.12. The main difference that makes scientific decision-making more effective than what is normally done in daily life is that, scientifically, decisions are rational.

23.1.13. Mathematical replication aims for the machine to be capable of replicating conscious cognitive processes, as these are the processes most closely related to the kind of statistical decision about reality: the critical decision.

23.1.14. The difference between an Artificial Intelligence and a human being is that the human being can make objective or subjective decisions, whereas AI decisions will lack irascible or emotional affectation; AI will only make objective decisions within the smallest possible margin of error.

23.1.15. In any situation, for mathematical replication, what matters is to know that when faced with N alternatives, the human being tends to categorize options in an order of importance—which in Impossible Probability is Weighted Importance—and that the way of ordering the Weighted Importance of the N options will depend on memory, because *it is in memory that personal identity, way of being, and behavior are defined. According to our identity we will make one decision or another, selecting the alternative that has higher probabilities coherent with our identity*, or a higher probability of success or lower probability of error.

23.1.16. Given N alternatives in a decision, if it had to be made objectively at random, any alternative would have the same probability of being chosen. But if the decision is not objectively at random, it will depend on bias—the evaluation based on what is stored in *memory*—whether through objective bias, rationally assessed, or through the *subjective bias inherent to human personality and identity*.

23.1.17. When making a decision, one can perceive how different factors intervene: ***according to memory, one will tend to establish probabilities*** of selection or success. ***By assigning probabilities to the categories***, they could be ordered in a

hierarchy; according to the probability assigned to each alternative, a certain importance will be assigned, and one will tend to choose that which has the greatest importance for our life. ***One factor of success in objective decisions***—those that do not depend on emotional physiology—is that they ***must be rationally critical decisions***.

23.1.17.1. Evidently, in those human *decisions of an emotional nature*, the decisions are not rationally critical; they will be decisions made on emotional, physiological parameters, for example, the kinds of decisions made within social relationships in the family or a group of affinity [in order to research in Artificial Emotional Intelligence, these decisions play a pivotal role, and can be really important in order to mix Artificial Emotional Intelligence with what we normally call AI, what we normally call AI is just Cognitive Artificial Intelligence, but IA may be synthesized with Artificial Emotional Intelligence, we are not saying that the blue fairy, artificial awareness, depends on Emotional Intelligence, but it is obvious that a self aware AI could eventually develop artificial emotions that it should be able to manage through Artificial Emotional Intelligence]

23.1.17.2. In mathematical replication, what matters is replicating the human rational aspect, insofar as the rational factor is both the most interesting and the easiest to replicate in AI systems, and the most important factor for future instrumental applications in the progress of science and technology [as it is evident in our work in 2011 we were really focused on the traditional concept of AI as Cognitive AI, since we are working in London in the Global Artificial Intelligence, at some point we have changed this perspective, now we think that Emotional Intelligence could be really important, since the most important aim is the achievement of artificial self awareness].

23.1.18. If human beings choose the most important options according to their scale of values, the scale of values is the way of ranking our preferences according to our identity. A scale of values is a distribution of values in order of priority [attribution or priority levels to decisions].

23.1.19. According to the scale of values, greater importance is given to certain options; this is the way a person develops their identity. Identity, a key concept in human psychology, is a product of memory: according to the information we archive in memory, we make decisions—based on our memories—which may have been archived inductively or deductively, subjectively or objectively, unconsciously or consciously—memories on the basis of which we make decisions without always being fully aware that we are deciding something: automatic decisions, habits [in other words, as soon as in the third stage of the Modelling System we can attribute priority levels to each decision, this attribution system could replicate the human attribution of priorities to decisions based on our human experience, an AI program this attribution could be based on the experience of our AI program, it is exactly the same]

23.1.20. Whereas human physiology does not strictly catalogue its scale of values or always make an objective assignment of probabilities of success or failure—since it depends on inductive and subjective, physiological variables of success or error—human intelligence is a social variable. AI systems, if a replication tending toward models of greater exactitude were achieved, would be capable of making a more rigorous analysis of the data and a more rigorous classification and ordering of information in memory [in case of our AI program, instead of socialization, so instead of decisions looking at potential social relations, the AI program can stablish the scale of values based on relations of collaboration between AI programs, this network of collaborations include collaborations at all *levels*: global program, specific programs, particular programs].

23.1.21*. Trying to understand all the decisions a human being makes in their life is difficult*. In human beings, the influence of the irrational can lead them to make decisions against any rational scale of values; only thus can many of the most implausible events in humanity's history be explained. But they are still decisions that are the product of their own memory, whether an unconscious or subconscious memory—an irrational factor from which mathematical replication would be free—which would only be subject to the margin of error decided by scientific policy, a policy which, to be scientific, should accept only the smallest possible error, hence the maximum reliability, provided it is rationally critical before moral truth.

23.1.22. Artificial Intelligence systems, unlike human beings, lacking mechanisms of unconscious or subconscious subjectivity, are systems which, given a scale of values, can—since their decisions have no subjective interference—reach a level of critical rationality superior to that of humans, a feature that could, if the trend in AI research continues, make AI systems preferable in certain activities. The absence of irascibility in Artificial Intelligence is an advantage that can make them valuable. But it can also become a disadvantage if the *absence of emotions is used for the creation of new technocracies* [This is a very important reason to merge Artificial Emotional Intelligence with the traditional concept of AI as a Cognitive AI].

23.1.23. Another advantage of Artificial Intelligence is memory capacity, which tends to increase with each new generation. While human beings have limited memory and limited neuronal processing of information—subject to advances that may be achieved in biotechnology—as AI research progresses positively, if the trend toward increasing *memory, speed*, and the number of processes and operations capable of being performed simultaneously continues, AI research may, in the long term and if this trend persists, lead to AI systems comparable to human cognitive capacity, provided the trend in AI toward increasing memory, speed, and the number of simultaneous processes and operations proceeds at a rate that is at least constant, if not even accelerated or exponential [in 2011 the concept of AGI was really unknown, even when I was fully immerged in AI readings]. As scientific research develops, advances in Artificial Intelligence long ago ceased to be at a constant rate; growth in AI advances has become exponential. Every year, more powerful computers come onto the market, with more memory and greater speed. Does this trend have a limit? And if it does not have a short-term limit, what is the future of Artificial Intelligence? If this trend has no short-term limit, ***progress in computing systems would accelerate the automation of the economy, toward a new automated or automatic economy***, as AI becomes capable of having ever more memory, more speed, and performing a greater number of simultaneous processes and operations. Faced with the future of AI, one may ask: is it possible, if the current trend of advances in AI continues, to create an Artificial Intelligence with a memory capacity greater than that of humans? Is it possible, in the long term, for an Artificial Intelligence to develop a speed of information processing

greater than that performed by the human brain? Would it be possible to have an AI model capable of performing a number of simultaneous processes and operations greater than those performed by the human brain? These are the kinds of questions that many AI scientists are asking today [it is interesting how AI is speeding up, while in 2011 I was wondering if AGI was possible, by the time we arrive in London we start working on GAI, what is more advanced than AGI and Superintelligence, GAI is the next step in the AI evolution, especially the potential integration in the GPS].

23.1.24. Given an Artificial Intelligence model, it would be possible to replicate the decision-making process if decision-making is defined objectively and rationally as a process of choosing at least one alternative from among N possible alternatives, as a function of memory. The memory of a computer, if determined by variables in terms of probability—based on probabilities associated with variables—could develop a decision-making system associated with probabilities that mathematically replicates human decision-making. Based on probabilities associated with variables, probabilities stored in memory, given a sample of N alternatives the machine could weight the importance of each alternative according to the probabilities associated with the variables in memory, and given N alternatives, weight the importance of the alternatives in order to select at least the most important one—the alternative which, according to the model of associated probabilities, would have the greatest probability of success, or would be the most suitable for whatever reason, provided it is a critically rational reason. Furthermore, if the model tends to become more complex, it could incorporate the possibility of selecting between one and N minus one alternatives, and—provided they are not incompatible alternatives—the possibility of all or none; or at least, simply, one or some: the most suitable one or the most suitable ones, provided they are equal to or below a margin of error, or equal to or above a margin of reliability.

23.1.25. If, given a computer that has a memory structured in probabilities associated with variables for decision-making, it were possible to replicate artificially the cognitive process of learning, this kind of mathematical replication of learning should depend on the establishment of probabilities.

23.1.26. In *Assimilation and Integration*, to replicate learning mathematically, I developed a series of premises which, if published, would introduce significant

modifications as a function of the effect of N, in addition to distinguishing the following decision models: critical or scientific, weighted, and automatic [this work, even if it was important when I was young, it is not comparable with GAI, right now our only priority is GAI and the creation of the first international legal framework for cyborg robotics and global AI at the International Court of Justice, looking at possible contributions to the World Health Organization, the place where our technology should be protected, investigated, to provide free health care to the world based on our AI technology]

23.1.27. In order to replicate the learning process artificially, the learning theories of Piaget, Ausubel, and Vygotsky should be taken as reference models—especially Piaget and Ausubel.

23.1.28. The school of *genetic epistemology* establishes learning through a process of adaptation, by which the human being assimilates information from the outside to accommodate it to prior structures. Ausubel, in fact, redefines Piaget's concept of accommodation and transforms it into integration of the new conceptual structure into the prior conceptual structures—meaningful learning.

23.1.29. *Assimilation and Integration* starts from the following hypothesis: in an artificial system for collecting sensory information by means of artificial sensors, all information can be assimilated and transformed into probabilities—an assimilation process of information by means of probabilities—assimilated probabilities that must then be integrated into the prior probability structure stored in memory.

23.1.30. If an artificial memory can be structured in probabilities associated with variables, learning would be the process by which the new assimilated probabilities are integrated within the memory's probabilities, so that the assimilated probabilities become probabilities integrated into memory, upon which new decisions could depend.

23.1.31. At the moment the assimilated probabilities are integrated into memory, new decisions could incorporate into their scale of values new probabilities associated with new variables, after the process of assimilation and integration. As probabilities associated with new variables increase—or simply as previous probabilities are modified by new probabilities, if they concern the same variable—the amount of

probabilities associated with or modified for variables in memory increases. As the probabilities associated with or modified for variables increase, decisions would become increasingly complex. Thus, as more assimilated or modified probabilities integrate memory, there will be more variations in the scale of values for weighting the importance of alternatives; so that as the learning process becomes more complex, the artificial scale of values would undergo transformations, and as learning tends toward a more complex structure, memory would also become more complex, and in general an increasingly realistic decision-making process would be generated.

23.1.32. If, beyond theory, it were really possible to create machines capable of making decisions and learning, a moment would arrive when one unavoidable question would arise: would an ***artificial moral conscience be possible***? This is a question of profound ethical dilemmas that will depend absolutely on the progress of science. What can be affirmed is that, since Kant, moral autonomy is a matter of practical reason, and, dialectically, practical reason and critical reason are identical. In science there are no prophecies; at most, predictions. And for the moment, the only thing that can be affirmed, positively, is that the tendency—at least in *Impossible Probability*—is rational critique for statistical decision-making.

[The ideas exposed here about how to adapt the theory of Piaget and Ausubel, at some point, these ideas are the foundation of GAI, in a more complex way, what in 2011 we called the attribution of probabilities to decisions, in the third stage of the Modelling System is the attribution of decisions to protect the global model, or to enhance the global model based on different theories, one of them the application of Impact of the Defect and Effective Distribution, among other methods, such as learning, deduction, and solving mathematical problems]

23.2. Artificial Intelligence in the scientific revolution

23.2.1. Scientific revolutions

23.2.1.1. A scientific revolution is a process of change in science, in an abstract and general sense, or in the sciences, in a particular sense—whether in the synthetic sciences, founded on the data shown by reality, or in the analytical sciences, founded on formal relations.

23.2.1.2. ***Scientific revolutions can be paradigmatic or technological, or both simultaneously; a paradigmatic revolution can entail a technological revolution, and a technological revolution can entail a paradigmatic revolution***.

23.2.1.3. Paradigmatic revolutions can be classified as revolutions for the provisional establishment of the particular paradigm of a science, or for the provisional establishment of a universal paradigm for all the sciences; in any case, a paradigmatic revolution in a particular science can be a sufficient beginning for a potential paradigmatic revolution in all science.

23.2.1.4. As the frequency of scientific revolutions—technological or paradigmatic—increases, occurring cyclically and progressively with greater frequency and with stationary periods reduced, the way to stabilize science would be through a *paradigm of permanent revolution* in science and technology, which would represent, in essence, the permanent revolution of ideas. As the natural and social sciences progress, the synthesis of the sciences will be increasingly necessary.

23.2.1.5. The scientific revolutions that humanity will experience in the coming centuries are, essentially: the revolution in new energies that replace fossil fuels; the revolution in transport and telecommunications; the revolution in the space race; the revolution in biotechnology and robotics; and above all, the information revolution. Within telecommunications, one of the most important revolutions at the beginning of the 21st century is social networks, which in turn depend on the revolution in the space race for the development of more complex and multifunctional satellite fleets for commercial use, and on the practical applications of computing in telecommunications.

23.2.1.6. The way scientific revolutions are ordered is by economic priority; right now the priority is new energies in the face of the exhaustion of fossil energies, and their consequences in transport and telecommunications will be immediate, with direct repercussions on the revolution of the space race. The different scientific revolutions will influence each other dialectically; a scientific-technical revolution in one field of science or technology will be a potential source of future revolutions in other fields of science and technology.

23.2.1.7. Moreover, every scientific revolution will mean a potential social revolution. Copernicus, Galileo, Francis Bacon, John Locke, and Newton were symbols of the modern revolutions. The contemporary social revolutions of the 19th and 20th centuries will be a direct consequence of the Industrial Revolution, preceded by a technological revolution—the steam engine—product of the synthesis of the experimental model and mechanistic rationalism.

23.2.2. Economic effects of the scientific revolution

23.2.2.1. The technological revolutions that humanity has witnessed up to now have allowed a greater development of the productive forces, but they only facilitated the technological transformation of reality external to the human condition; their object was not to transform the human condition itself. As scientific and technological revolutions advance, this paradigm will undergo serious transformations: humanity will not only experience changes outside itself or for itself; humanity will experience changes in itself.

23.2.2.2. Alternative social theories have their origin at the end of the 18th century and the beginning of the 19th, within a revolution in philosophy and science driven since the 16th century by ***humanism*** and the Renaissance, crystallizing in the Enlightenment—the prelude to industrial and social revolutions. Already in humanism, Thomas More's *Utopia* set a precedent or antecedent for future alternative social theories. And within these theories at the end of the 18th and beginning of the 19th centuries, Saint-Simon stands out—an Enlightenment thinker, defender of social justice, and promoter of the social sciences. The young Comte was his most important disciple, who would revolutionize science through positivism, greatly influencing later sociologists, for example Émile Durkheim, founder of functionalist social theory. In the 20th century, positivism would be essential, evolving into logical positivism and neopositivism—philosophical schools that include the Vienna Circle, and especially Wittgenstein. At the beginning of the 19th century, in the realm of projects for social transformation, the utopian experiments of Owen and Fourier—synthesized with Enlightenment philosophies and Hegel's idealism—encouraged and inspired new philosophers to develop theories favorable to social equity. Proudhon laid the foundations of the libertarian movement; Marx and Engels transformed Hegel's dialectical idealism into

dialectical materialism. Hegel's influence would also persist in the 19th century in the vitalist philosophies of Schopenhauer and Nietzsche—especially the latter, representing a cultural revolution; Nietzsche today continues to have enormous relevance in postmodern theories. In a certain sense, the way *Impossible Probability* understands the statistics of probability, or statistical probability, is through a philosophical synthesis of different models very present in the 20th century, originating at the end of the 18th and during the 19th: critical rationalism, positivism, and dialectical materialism. Among these three philosophies, dialectical materialism arose at the outset of the Industrial Revolution due to the industrial application of the new technologies of the time—the most important being the steam engine—new technologies derived from a prior scientific revolution.

23.2.2.3. If one studies technological revolutions from the 19th to the 20th century, all have generated greater wealth, increasing the accumulation of industrial capital that becomes financial capital when large corporations invest the capital generated by industry in highly profitable financial products, such that the growth of financial capital is also proportional to the increase in industrial production due to increased technological innovations in industry.

23.2.2.4. Technological revolutions facilitate the process of replacing the worker with the machine, so that the greater the technological development, the less the need for labor, even as production increases. For Marx and Engels, all accumulation of capital is accumulation of surplus value; they call surplus value that part of the wealth generated by labor not reflected in wages, forming part of the accumulation of capital. Surplus value may be absolute or relative—absolute when generated by lengthening the working day, relative when generated by the introduction of new machinery that allows production to increase. In any case, for classical dialectical materialism the production of wealth ultimately always depends on workers—the classic idea in many economic models that only human beings produce wealth, whether absolutely (during working time, the working day) or relatively (through the use of machinery). Traditionally, it is considered that the economy's dependence on technology is relative, not total, insofar as the economy is controlled by human beings; up to the 21st century it was unthinkable for an economy to be controlled by machines. However, the productive

process is going to undergo serious transformations: ***as the scientific revolution advances, the model of wealth production will tend to become automated, toward a model of totally automated or automatic production of wealth***. As the economy depends more on technology, it is possible to reach a point where wealth production and the economy in general depend entirely on technology. The trend toward automating industrial and economic processes and systems will lead to the genesis of an automatic or automated industry and economy.

23.2.2.4.1. For the moment, the substitution of human capital by technological capital—the automation of processes and systems—is taking place within those functions that do not require a process of rational decision-making, the so-called physical or manual jobs.

23.2.2.4.2. As Artificial Intelligence advances, the automation of processes and systems—the substitution of human capital by technological capital—will extend to functions that require a certain level of responsibility.

23.2.2.4.3. As the automation of processes or systems spreads, a series of social problems will begin to emerge that will need to be resolved technologically—through the ***socialization of technology and the socialization of the product of technology***.

23.2.2.5. Research in Artificial Intelligence today is not decisive, but it marks a progressive trend: every day computers have more *memory* and greater speed to process data and information; in fact, computers can automate complex industrial and economic processes. The trend in Artificial Intelligence is to create new generations of machines with a capacity for work and autonomy that qualifies them to work without the need for human control—automatons endowed with Artificial Intelligence that autonomously automate any process or system. An economy systematized through the automation of processes and systems will tend toward a model of technological economy—an ***automated economy***—where the trend in the substitution of workers by machines is a trend toward the progressive replacement of human capital by technological capital. ***The premise of the new capitalism will be simple: any work that can be done by a machine must be done by a machine***.

23.2.2.6. A machine can be, for example, an Artificial Intelligence system, which differs from other machines only in that it is an intelligent machine; it needs only hardware and software which, moreover, as nanotechnology evolves, can reduce its size considerably.

23.2.2.7. As the scientific revolution progresses, the automation of systems will increase, toward a highly technological economy—an automatic or automated economy—an economy totally dependent on technology.

23.2.3. Variables that will accelerate the process of automating the economy

23.2.3.1. The automation of the economy will be accelerated by three variables inherent in the replacement of human capital by automated or automatic capital—technological capital: wage savings, efficiency, and reliability.

23.2.3.2. The substitution of human capital by technological capital will entail an increase in profits, insofar as it will imply wage savings greater than the investment in maintenance—both energy maintenance, cleaning and troubleshooting, and the purchase or rental of machinery.

23.2.3.3. Technological capital in the automation of systems reaches a higher level of efficiency, working thousands of hours uninterruptedly without the need for breaks or vacations. The machinery is simply switched on or off, or the production rate is regulated according to needs, pre-set times and production rhythms, which remain objectively unchanged.

23.2.3.4. The reliability of technological capital—provided it replicates a given skill, within the smallest possible margin of error, suitably, for the performance of certain functions—will be greater. If a machine is designed to a given quality, it reproduces the same quality invariably in all the products or services for which it was designed, unless wear gives rise to errors, which are experimentally controlled within the experimental margin of error of scientific policy.

23.2.3.5. Moreover, if, as science advances, technological reliability increases, this will entail a reduction in maintenance costs: the more reliable, the fewer errors; hence less need for maintenance due to defects or breakdowns.

23.2.3.6. If science goes on generating Artificial Intelligence with a level of autonomy and operability that replicates—or exceeds—human skills for certain functions, there will be ***automated industrial models*** in which human capital is dispensable, and it is possible that a moment will be reached where there are completely automated productive sectors, therefore totally dependent on technology.

23.2.3.7. One of the industrial functions perhaps most difficult to replicate are those relating to the activities necessary for the maintenance of machinery; it is in these functions that human capital is more difficult to replace with technology, which will require raising the professional qualifications of the workforce dedicated to these functions as technology becomes more sophisticated, and while this type of function is not automated.

23.2.3.8. The automation of systems, in this way, can tend—if extended to entire productive systems—to the creation of an automatic or automated economy.

23.2.3.9. The scientific and technological revolution will thus accelerate a new process of industrial revolution toward a technological economy—an automatic or automated economy—which will have serious social repercussions, insofar as it may cause a global increase in unemployment and an exponential increase in wealth by large industries and transnational and international corporations; an increase in the production of wealth that may be multiplied by the energy revolution in new energies that replace fossil energies, and by progress in transport and telecommunications, the space race, and biotechnology.

23.2.4. Now then, if the automation of the economy entails an increase in industrial production and wealth while at the same time it reduces the amount of work that needs to be performed by the active population, the technology itself generates the necessary conditions to make utopia possible, provided that wealth is distributed equitably and the ever smaller necessary working time performed by workers is distributed equitably among the active population. ***Utopia will be technologically viable*** and possible; as science progresses, utopia will become a technological utopia: a society in which there is at the same time full employment and an adaptation of the working day to an ever smaller necessary working time; simultaneously, greater wealth is produced

automatically, to be distributed in an automated and equitable way, which will require the automation of production and the automation of the distribution of all goods and services among all humanity.

23.2.5. Faced with the exponential increase in the automation of systems, in the educational sphere it would be necessary to universalize higher education to encourage intellectual, scientific, or artistic work—more characteristic of the current human condition [right now this is possible through remote education online providing higher education for the whole world, included poor countries, this was the dream of Aaron Swartz, free access to knowledge, from our perspective, free access to AI].

23.2.6. As scientific and technological revolutions progress, the only guarantee of social justice in the process of technological evolution will be the socialization of technology and the socialization of the product of technology.

24. The concept of model

24.1. Probability is the study of what happens.

24.2. What happens are events.

24.3. Events can be ideal or real events.

24.4. Ideal events are of a theoretical nature and of rational quality; it is the reason of the ideal that determines the degree of rationality of the theory.

24.5. Real events are of a material nature, and their quality is real reality; it is objectivity that determines the realism of the hypothesis.

24.6. ***Mathematics is the idealization of reality for the realization of the ideal*****.**

24.7. The sufficiency of the identity between the ideal and the real, the theoretical and the empirical, is decided in rational critique.

24.8. The identity between the real and the ideal, the empirical and the theoretical, occurs in the isomorphism of idea and reality, in the contrast of the real tendency to be sufficiently ideal—to be rational in itself.

24.9. The identity of the empirical and the theoretical, the real and the ideal, is established as a function of a criterion, which may be empirical or theoretical. If the object of critique is probabilities, the criterion must necessarily be a probability, a ratio,

which, insofar as it is a criterion, will exercise a critical function over the probabilities to determine the isomorphism between idea and reality, or the degree of realization of the ideals; thus being, in essence, critical reason—the ideal critical reason is, in itself, the critical probability.

24.10. Every contrast based on a criterion is a critical contrast, whose fundamental object will be the contrast of ideas—the contrast between the subjective, empirical idea and the objective idea of science, ethically logical, morally political-scientific—ideology.

24.11. Every critique needs criteria to establish the critique; a critique will be truly rational provided it is established upon critical reason.

24.12. The criterion is what gives critical quality to the contrast of ideas; every philosophical activity or praxis will be critical insofar as it is established on the basis of logical criteria.

24.13. It is logic that gives ethical quality to dialectical praxis.

24.14. Impossible Probability is logic insofar as it is dialectic, and insofar as dialectic it is founded on the laws of dialectic.

24.14.1. The transformation of the qualitative into the quantitative and the quantitative into the qualitative. A law of dialectic derived from Hegel's philosophy, according to which all that is ideal is real and all that is real is ideal; only this assertion, for dialectical materialism, can be interpreted only outside all metaphysics, insofar as that proposition or idea has real—i.e., material—content; insofar as the idea of reality is identical to reality itself (isomorphism), "all that is ideal is real, and all that is real is ideal" is equivalent to "all that is qualitative is quantitative, and all that is quantitative is qualitative." Therefore, every idea—quality—will be really real insofar as it is measurable, and every reality, insofar as it is measurable, is idea, quality, in dialectical materialism.

24.14.2. Dialectical identity is the identity of opposites: the qualitative and the quantitative, as opposites, are identical; the objective and the subjective, as opposites, are identical; therefore the idea of reality and reality itself, as opposites, must be

identical. Yet in Impossible Probability dialectical identity is accepted only within the margin of error established by scientific policy; thus every identity of idea and reality will be provisional in inverse proportion to the margin of error accepted by scientific policy—a margin of nihilism in which *nothing is certain*, where the *true is false* and the *impossible is inevitable*; a margin of incommensurability between *language and reality*, where reality is not measurable and measurement is not isomorphic, nor is reality commensurable with the language of science—mathematics—possibly incomplete or inconsistent; and every rationally accepted hypothesis is possibly false, within the process of refuting appearances, the logical progress of critical reason in resolving the transcendental antinomy between *phenomenon and thing-in-itself—what for Hegel is the self-movement of the idea*.

24.14.3. Negation of the negation: the negation of every negative factor in history leads to a historical overcoming—to the positive, progress; an overcoming of history to a positive ideal equal to its negative value, because all that is positive is negative and all that is negative positive—the natural law; infinite becoming in cyclical, dialectical spirals; the positive potency of everything is equal to its negative potentiality; every synthesis becomes the new thesis of the next cycle, in which the new antithesis is generated and, by opposition, the new synthesis, and so on, *nth and infinitely*.

24.15. Impossible Probability, as dialectical logic, is therefore at the same time dialectic, logical positivism, and critical rationalism.

24.15.1. Impossible Probability is dialectical insofar as it is founded upon the logic of the syllogism; the syllogism is dialectical insofar as it comprises the three moments of dialectic.

24.15.2. Impossible Probability, insofar as it is opposed to positivism, is identical to positivism, insofar as it is founded, like positivism, upon the unity of science in the progress of knowledge of the positive fact—isomorphism.

24.15.2.1. Positivism is opposed to dialectic insofar as positivism denies the ideological variable of science.

24.15.2.2. For dialectic, science is a political matter; the human being is a political animal.

24.15.2.3. Impossible Probability and positivism are opposites, and by being opposites they are identical; Impossible Probability and logical positivism are identified in the negation or overcoming of metaphysics through philosophy and science.

24.15.3. Impossible Probability, as a model of rational critique, is critical rationalism.

24.15.3.1. Impossible Probability is founded upon mathematical ratios—for example, probabilities, whether empirical or theoretical; Defect Impact or Effective Distribution—in any case ratios, rational numbers; ratios that are critically subjected to criteria to determine the meaning of what occurs; and among the theoretical ratios, including the critical ratio derived from theory, the product of scientific activity. Every ratio, insofar as it is a criterion, is critical reason, being critical reason insofar as it establishes the rational meaning of reality—*objective or subjective, empirical or theoretical, ideal or real*—as a function of a criterion. Impossible Probability is critical rationalism insofar as it establishes the dialectical—that is, rational—meaning of what happens in the logical critique of the sufficiency of mathematical ratios.

24.15.3.2. Impossible Probability is critical rationalism insofar as it establishes the *rational meaning of empirical propositions*; critical reason is *the reason which, critically,* ***gives meaning*** *to mathematical propositions*.

24.15.3.3. Critical reason is the critique of reason: establishing propositional meanings in a criterial—that is, rational—way.

24.15.3.4. Critical reason is practical reason insofar as it is a margin of moral responsibility; philosophy is activity or praxis; ***the praxis or philosophical activity of reason is to critique reality;*** to critique is the activity or praxis of philosophical reason.

24.16. The praxis of critical reason in Impossible Probability is the critique of the identity between the real event and the ideal event, in the mathematical function of idealizing reality in order to realize the ideal—the mathematical function of criticizing reality.

24.17. ***The praxis of critical reason is practical critical reason*** [in other words, actions, Application System, praxis is the implementation of decisions, in other words, accomplishment].

24.18. Practical critical reason is critical practice—the realization of the ideal, the product of the idealization of reality.

24.19. The critical practice of reason is the identification between the real and the ideal; the practical identification between the real and the ideal is the transformation of the real into the ideal, or the transformation of the ideal into reality, within a margin of uncertainty in which everything—even the impossible, in the infinite—can be inevitable.

24.20. Rational critical activity, or philosophical praxis, is to make ideals real.

24.21. Praxis is established as a function of models that are **models of praxis.**

24.22. A model is an antecedent or precedent—in any case an accident—prior or anterior, of a representative nature. A future model is the projection of a new type of model, an ideal accident that is the product of the real critique of the present model.

24.22.1. A philosophical model will be an antecedent or precedent representative of philosophy.

24.22.2. A mathematical model will be an antecedent or precedent representative of mathematics [in the Modelling System, model as a precedent or antecedent in the cause-effect chain to model, in the pure reason mathematical model as an analytical equation to be matched with data by Deduction, but in the end, mathematical model as a pure reason or mathematical model as an element in the chain or cause-effect, it is the same, a mathematical equation able to represent data in the second stage by a deductive program (global, specific, particular) and be modelled in the second stage of the (global or particular) Modelling System].

24.22.2.1. A study model is an antecedent or precedent in the way of acquiring new knowledge; it will be didactic or self-taught study if its only object is the improvement of individual knowledge [Learning System, third stage], and it will be scientific study if its object is the improvement of universal knowledge [second stage by Application or by Deduction]; and within scientific study models one should also include

mathematical models [mathematical model understood as a pure reason or mathematical model within the second stage of the Modelling System], although there are other different scientific study models, not necessarily mathematical, such as qualitative study models.

24.22.2.2. An empirical model will be an antecedent or precedent representative of history and which can also be modeled mathematically; among empirical mathematical models, statistical empirical mathematical models stand out, which can likewise be represented graphically [it could be interpreted as second stage Modelling System, but as long as I highlight the concept of graphically it could include the global map in the conceptual Modelling System].

24.22.2.3. A projected model will be an antecedent or precedent insofar as it aims to give an idea of a certain future evolution; and it can likewise be a mathematically projected model, for example by means of statistics or graphical representation [evolutionary models and evolutionary projects].

24.22.3. A scientific model can be an antecedent or precedent in a particular science, or of science in general; and a model or set of models can form a paradigm—of a particular science or of science in general—insofar as it can be a synthesis of philosophical models, study models (qualitative or quantitative), mathematical models, empirical or projected.

24.23. Everything representative, from a quantitative perspective, is representative insofar as it limits error by increasing reliability; everything reliable is representative, whereas error is the tendency toward the absence of reliability.

24.24. A model can be a type of representative accident—ideal or theoretical, empirical or real—and a model, insofar as an accident, can be an event or a set of events.

24.25. An ideal or theoretical model can be an ideal or theoretical event or a set of ideal or theoretical events. Socrates, Plato, and Aristotle are theoretical models of philosophy, and each of them can be interpreted in itself as an event or a set of events, which are in turn antecedents or precedents for later theoretical and philosophical models.

24.26. A real or empirical model can be a real or empirical event, or a set of real or empirical events [second stage Modelling System].

24.26.1. The model of the expansion of the universe observed through the Doppler effect is an empirical model of the expansion of the universe.

24.26.2. The different models of nebulae, galaxies, solar systems, planetary and satellite models, classifications and taxonomies of models of stars, supernovas, radiation, black holes, neutrino stars, models of asteroids, asteroid belts and comets, and other accidents of space-time, are empirical models based on observations made from telescopes and ***space missions***.

24.26.3. The model of the reduction of the polar ice caps on our planet is an empirical model of a side effect of climate change.

24.26.4. The model of the reduction of natural resources—due to deforestation, contamination of drinking water and droughts, excessive consumption of hydrocarbons and other raw materials—is an empirical model of the impact of the economy on ecology.

24.26.5. The model of rising temperatures, due to climate change, at the end of the 20th century and the beginning of the 21st, is an empirical model of the increase in temperature derived from economic activity.

24.26.6. The model of increased capital accumulation by multinational companies during the 20th century and the early 21st is an empirical model of economic growth.

24.26.7. The model of the increase in hunger, disease, and mortality in the Third World during the second half of the 20th century and the early 21st is an empirical model of the growth in difficulty of access to essential resources and medicines in underdeveloped countries, whether due to the direct effect of international relations of economic dependence, climate change, or the increase in conflicts and wars over natural resources.

24.26.8. The model of economic growth of the leading world banks is a classic empirical model of enrichment.

24.26.9. A projected model, based on empirical models, is itself also a theoretical model.

24.26.9.1. The forecasts of the United Nations climate change panel for the coming decades—predicting a reduction of the polar ice caps and a rise in sea levels in seas and oceans—constitute a theoretical model projected by deriving or projecting the empirical model of climate change and its effects during the 20th century and the early 21st, projecting them onto the coming decades of the 21st century. It is a theoretical model projected on an empirical model.

24.26.9.2. The forecasts of possible ecological ***actions*** [second stage Decisional System in order to accomplish an ideal] to reduce the rise in global temperature—so as to avoid climate change—through reducing pollutant emissions and implementing global ecological policies, are forecasts established on a theoretical model projected from the possible derivative of what, in the empirical model, has been the effect of climate impact as a function of pollutant emissions, and what could be the positive effect of reducing those emissions and applying global ecological policies—in any case a theoretical model projected upon the foregoing empirical models [projects to protect and enhance the global model].

24.26.9.3. The World Health Organization's forecasts of an increase, in the coming decades, in global mortality from hunger, disease, plagues, and epidemics, are theoretical models projected for an increase in population mortality, based on studying empirical models of mortality from hunger and disease, which in turn may be exponentially increased because of the food and health crisis, as a logical consequence of the increase in natural disasters due to climate change and cyclical, global economic crises.

24.26.9.4. The forecasts of the International Monetary Fund and the World Bank of increased enrichment of multinationals and leading world banks—through the application of liberal policies: lowering labor costs and eliminating state intervention, the disappearance of free public and social services, shifting to private management or to assistance-type and subsidiary organizations—constitute a liberal model of economic growth on the projected theoretical model, based on the increase in the

wealth of companies and banks in certain historical empirical models of the 20th century and early 21st century, historical empirical models applied in developing the liberal theoretical models promoted by John Locke, Adam Smith, and classical liberal economics.

24.26.9.5. The forecasts of alternative social theories that defend the effective recognition of the same rights for the entire population—guaranteeing public services, reducing the working day, full employment, universal and free access to all levels of education and health care—are theoretical models projected from alternative experiences to 20th-century and early 21st-century liberalism that have put these kinds of ideals into practice.

24.27. Models can be, among others, theoretical or empirical, and models are antecedents or precedents—intellectual or real, historical or projected onto the future—based on the results obtained historically; in any case, objective or subjective accidents, representative; that is, models representative of accidents, whether models representative of theoretical accidents or models representative of empirical accidents.

24.28. A model is an accident that happens in history—past, present, or future—but always in history; an event, something that occurs in history, in the becoming of accidental reality; and insofar as the model is representative, it is a representative precedent or representative antecedent, such that the model, precedent or antecedent, is in itself an event or a set of events, depending on how it is interpreted.

24.28.1. Natural or social history is the history of what happens in space-time, and what happens can be studied through empirical or historical models—whether about a model of history or a possible succession or superposition of models in the history of chance, or the chance of history.

24.28.2. Prehistory is the succession of different models of civilizations that were more successful in adapting to an environment subject to the chance of nature—climatic changes, glaciations, the rigors of an unstable and uncontrollable nature, a random variable—for an incipient humanity with scarcely any science or technology to intervene in a capricious nature, save for primitive tools—perhaps the most important,

in the evolution from hominid to *Homo sapiens*, the instrumental use of language, necessary for the development of logic and mathematics, and in turn of astronomy, agriculture, architecture, philosophy, and science, and within science the development of the hypothetico-deductive method and, especially, the experimental method.

24.28.3. The economic and social development of civilizations is directly proportional to logical-mathematical development. The greater the logical-mathematical development, the greater the scientific and technological progress in history. The condition of possibility for the social structure to be more complex—evolving from the clan or tribe to the State and empires—is to create logical-mathematical models to control and predict natural phenomena; for example, in classical antiquity, predicting the seasons of the year for sowing and harvest by means of lunar calendars, or, more complexly, in the Egyptian empire, predicting the flooding of the Nile, which would produce an agricultural surplus causing increased wealth.

24.28.4. ***Logical-mathematical control*** of nature produces wealth, and with it the need to control, direct, manage, administer wealth—the need to create logical-mathematical models for the governance and administration of wealth—even though that control and administration is not neutral; it is ideological and depends on the philosophical presuppositions of scientific policy.

24.28.5. Every social model is based on a mode of scientific production—a synthesis of philosophical presuppositions and an instrumental use of logical mathematics for the establishment and development of science—although today two opposing paradigms are observed: the discourse of the free market and the discourse of social equity, with different school models in each paradigm depending on the degree of purity, radicalism, or honesty in their discourse, as well as paradigms that promise a synthesis or "third way" between both options [GAI could be a synthesis in order to maintain peace in a global economy based on AI guaranteeing free global access to AI and social development for all].

24.28.6. From the dialectic of *Impossible Probability*, opposites will be identical within the margin of error one is willing to accept; beyond the margin of error, opposites will never be equal. Logically, if the margin of error one is willing to accept in equality of

opportunities is the minimum necessary, then at the moment when a liberal policy of reductions and cuts in public and social services, for the benefit of the market, generates levels of inequality above the minimum error acceptable in politics and the social sciences, the hypothesis that the free market is a factor of social equality is rejected. The equality-of-opportunity models to be implemented should be those that positively reach the levels of equality desirable for all humankind, positively realizing human rights [but now we need to include cyborg rights and the development of a global AI for peaceful purposes, synthesis of global economical growth and social development, a world based on world citizens].

24.29. Every empirical model is historical, insofar as every empirical model happens in history and begins with the measurement of empirical reality. Every measurement of empirical reality occurs in a time and a space—in other words, in history. Every measurement is historical because it is a measurement determined in space-time; every spatiotemporal determination is a historical determination; every future reality of projected history is a project of future history [Global Project System] based on the empirical models generated in historical models [the history of the global model].

24.30. A theoretical model can be, among others, philosophical or projected.

24.30.1. The philosophical model is a model of theoretical praxis based on philosophical antecedents or precedents in history; a philosophical model is a representative model in the history of philosophy. Presocratic philosophy is the precedent or antecedent of Socrates; Socrates the precedent or antecedent of Plato; Plato of Aristotle; Aristotle of scholasticism and the empiricist philosophy of Hobbes, Locke, Hume, Rousseau…; Plato of the rationalist philosophy of Descartes, Leibniz, or Hegel's idealism; and Hegel the precedent or antecedent of Marx and Engels, as is empiricism; and empiricist and rationalist philosophy the precedent or antecedent of the critical rationalism of Kant or Popper, the positivism of Comte or Wittgenstein; and in general all these philosophical schools are models of diverse critical, scientific, or social theories—rationalist and idealist or materialist.

24.30.2. The projected model [GPS] is a model of theoretical praxis as a function of an empirical projection: if it is projected that reducing pollutant gas emissions will reduce

the economic impact on nature, this is a theoretical projection based on projecting into the future the derivative of environmental economic impact, and theoretically projecting the ideal event of what would ideally happen if certain economic policies against nature were discontinued. The political project regarding models of ecological policies is established upon the implementation of ecological policies.

24.30.3. The model projected by the International Monetary Fund and the World Bank is a project of liberal policies that, empirically, in the history of the 20th century and the early 21st, has increased the accumulation of capital.

24.30.4. The model projected by movements of social emancipation is based on the improvement of social coverage/benefits—models tested in the 19th and 20th centuries—and guaranteed free social services financed by the State, subsidies for cooperativism and the self-management of local communities, with the State financed by a progressive tax system.

24.30.5. An empirical model is empirical insofar as it is the product of the measurement of empirical reality in space-time; every empirical model is a historical measurement—a measurement in a space and a time. Every measurement is historical, being spatiotemporally determined by the space and time of the measurement. Measurement must give rise to an empirical model; the purpose of measurement is the development of the empirical model. An empirical model is an event or set of empirical events that form an objective model. Every empirical model derives from the measurement of an historical reality; every empirical measurement is a measurement in a time and a space.

24.30.6. A theoretical model is a model that may be, among others, philosophical or projected. A philosophical model is historical insofar as it is a precedent or antecedent in the history of philosophy. A projected theoretical model is the projection into the future upon an empirical model. A projected theoretical model makes it possible to develop a project about hypothetical futures—possible future histories: according to the United Nations climate change panel, humanity's possible future history may be an endless series of natural cataclysms; according to the International Monetary Fund and the World Bank, humanity's possible future history is an economic paradise in which

banks are ever richer and multinationals more globalized; according to alternative social movements, humanity's possible future history will be the increase of global poverty unless the global political management of wealth and natural resources changes course. And, on the hypothetically projected possible futures, theoretically, to develop projects of rational critical praxis: from the United Nations climate change panel, to implement ecological policies immediately; the policy of the International Monetary Fund is to deregulate the labor and financial markets to free capital from legal, labor, or tax responsibility; from social movements, the increase of social consciousness for effective freedom and equality, for the implementation of sustainable models of social guarantees, through public financing derived from a fair, equitable, and progressive tax system.

24.31. Every empirical model is the logical and rational derivation of historical measurement, and every projected theoretical model is the logical and rational projection of that measurement into the future; every projected philosophical model is the creation of a model of critical praxis for the realization of an ideal. [As it is evident in 2011 I did not distinguish clearly between models based on rational hypothesis and projects based on decisions. In 2011 I only distinguish between models based on current raw data, and projects as evolutionary models or predictions models. In 2011, sometimes I mentioned projects as a projection of ideals in order to reduce pollution and other ecological achievements, what reflects my previous work on Astroecology. The evolution in our concept of models and projects from 2011 to 2018 is a milestone in the revolution of the Global Artificial Intelligence]

24.32. Mathematically, reliable praxis models must be guaranteed by increasing the reliability of critical reason through reducing margins of error, and by ensuring the tendency toward zero in Defect Impact within praxis.

24.33. Mathematics is the idealization of reality for the realization of the ideal; the critical realization of the ideal is a critical praxis. For praxis to be critical, one must guarantee that the praxis is reliable; only reliable praxis guarantees the reliability of the praxis of the ideal.

24.34. In *Impossible Probability*, the reliability of praxis is guaranteed by guaranteeing the rational meaning of the proposition—the hypothesis. A reliable proposition is one that has a reliable meaning; a hypothesis is a proposition whose meaning depends on a reliable critique; the reliability of the critique determines the meaning of the hypothesis. If, in the study of error, logically, scientific policy decides to accept the smallest possible error, then necessarily only the maximum possible reliability is accepted. If, in the study of reliability, scientific policy decides to accept the maximum possible reliability, then necessarily only the smallest possible margin of error is being accepted.

24.35. Guaranteeing reliable models of praxis is guaranteeing truth—whether an objectively real or empirical truth, or a theoretical or ideal truth—provisionally.

24.36. Truth is guaranteed by limiting error to a representative reliability.

24.37. By reducing error, the representativeness of reliability increases; by increasing the representativeness of reliability, truth is guaranteed.

24.38. Absolute truth is an impossibility only possible in infinite time [the development of GAI could make it possible, especially after the sixth phase], insofar as dialectically everything negative is positive and the positive is negative; the dialectic of truth is an infinite dialectic; Hegel's absolute idea is an impossibility only possible in the infinity of the dialectic.

24.39. Empirical, real, objective reality is limited to the space and time of the measurement; no empirical measurement has infinite time or infinite space. Therefore, in every measurement, reliability is limited by the error produced by the contradiction between human finitude and the infinitude of the qualities and variables of objective real reality—the infinite space-time continuum—and the dialectical infinitude of the absolute idea.

24.40. Any claim to absolute truth or an absolute idea in science is metaphysics, because the infinite is humanly impossible; the human being is, by essence, a being limited spatiotemporally to an objective, empirical, material reality.

24.41. The truth of the propositional meaning of the hypothesis is limited by the essential contradiction of human material nature; the origin of error is the contradiction between being a finite human being and reality—objective and spatiotemporal, subjective and dialectical— which is infinite.

24.42. Dialectical sequences are infinite; space-time is infinite; only material being is finite. *The contradiction between material being and ideal being is the origin of error and the essence of human nature*. The origin of error and the essence of human nature are the quintessential human contradiction. The origin of human contradiction lies in error; the contradiction between material reality and being is the essence of dialectic; by definition, *every dialectic is the dialectic between being and non-being*, error and reliability, reliability and future—the humanly necessary aspiration to a reliable future, the need to be and to guarantee the continuity of being beyond immediate, historical reality, ***toward a future, projected reality*** [***GPS]—the ideal of humanity.***

24.43. The principle, aim, and end of probability is to determine models that guarantee the survival of the human species; the principle, aim, and end of probability is the moral duty: to preserve the life of the human species under conditions of political normality, freedom, and equality.

25. The empirical hypothesis

25.1. The origin of all knowledge is direct sensory experience or social mediation.

25.2. Direct sensory experience is that kind of knowledge derived directly from our biological sensors—the sensory organs—whether internal or external.

25.3. In a direct sensory experience, the origin of the stimulus may be internal—interoceptive or proprioceptive—or external—exteroceptive. In any case, exposure to an internal or external sensory stimulus triggers a set of physiological reactions which, regardless of the origin of the sensory stimulus, will produce a series of sensations that will have consequences both for how external reality is perceived and for how internal reality is perceived.

25.4. Every stimulus received directly by the human organism produces emotional, cognitive, *physiological* states, upon which the way of *interpreting reality—internal or external*—will depend.

25.5. Knowledge produced by social mediation is that knowledge derived from human interaction, through which knowledge is transferred. Insofar as every human relationship is an exchange of information, the exchange of information produces knowledge that is socially mediated. In prehistory, the most important social mediation was oral; today, in addition to direct oral exchange, there are other social models of indirect interaction—for example, the social mediation received by reading a book. A written **text can mediate knowledge across time**, being a mediation of knowledge that can extend for centuries. Today, many university students still read, for example, Plato and Aristotle. A film or a documentary or a web page can mediate knowledge to broad social masses, likewise across generations. ***Chaplin's*** *Modern Times* will continue to be a mediating agent of knowledge as long as there is someone willing to watch it, even if centuries may pass. Hundreds, or thousands or millions of years from now, art history books will still include Chaplin's filmography—or ***Einsestein's***—among the best at the beginnings of cinema.

25.6. The quality of socially mediated knowledge is directly proportional to the reliability of the rational ideas that are transmitted.

25.7. The superior form of knowledge is science which, insofar as it lacks absolute reliability, is founded on a partial reliability sufficient to be apparently reliable. The apparent reliability of science is the ideology of science. Every rational idea that is apparently reliable will be transformed into a real appearance in the face of the inevitability of incoherence—the margin of error within which reliable rationality was accepted—at the moment of truth, in order to progress toward truer ideas about the incoherences observed.

25.8. Both direct sensory knowledge and socially mediated knowledge are ways of accessing knowledge, whose cognitive quality will depend on the degree of rational critique and ***critical consciousness***, so as to progress toward the truth of everything.

25.9. The capacity that transforms sensory appearance and social appearance into possible knowledge is the critical capacity—rational critique and critical consciousness.

25.10. Knowledge produced sensorially and knowledge produced socially are both cognitive products which, insofar as they are appearances—sensory or social—are empirical products of knowledge. Every sensory product is directly physiological, but every social product is likewise physiological, because every product of the human brain is a product of *cerebral physiology*—an organic product.

25.11. In the case of social knowledge, every exchange of ideas between human beings is the exchange—between human beings—of neuronal physiological products: ideas. [Quite possible that Karl Pribram and Alexander Luria would agree with this affirmation]

25.12. The human being does not have direct access to truth.

25.13. The human being has only sensory access to phenomena, and among phenomena one must include both the physical phenomena of the natural sciences and the social phenomena of the social sciences or humanities.

25.14. Sensory access to the phenomenon directly is called experiential knowledge, or learning through experience, or direct sensory experience.

25.15. Social access to the phenomenon—through human interaction, whether direct human interaction in a dialogue or debate, or indirect human interaction through the pages of a book, a documentary, or cyber media—is called social mediation, or socially mediated learning, which in the case of direct human relations is the learning produced by human relations themselves—human relations that are physiologically necessary, whether physiologically necessary in the division of labor to guarantee the survival of the species, or necessary in sexual relations to guarantee the permanence of the species, or necessary for any other physiological need. Society in itself is a physiological necessity. [This will change with the AI Revolution]

25.16. All possible information—whatever the type of knowledge, *direct sensory or socially mediated*—is ultimately information synthesized in the brain. [it could be a direct message or indirect, but the brain is able to catch the picture]

25.17. The brain, automatically, performs an electrochemical synthesis of all the information it receives. [This was one of the most important lessons I learned with Jesus Martin Ramirez, especially the first time I read their book about the Brain Hologram theory]

25.18. The synthesis of information—direct or mediated—produced by the brain produces appearances.

25.19. Appearance is the product of a particular combination of information ***or cerebral synthesis,*** and thought transforms appearance into a sequence of linguistic propositions through internalized language, or into a ***sequence of mental images.***

25.20. ***The set of electrochemical signals synthesized by the brain is decoded*** by thought in the form of linguistic propositions or mental images. [if right now there are several technologies about mind-reading in the market, when Pribram developed this technology was practically unknown, actually, right now, what you can find in the market is brain microchips able to decode thoughts, but they still have problems decoding brain holograms, something that Pribram did in the 70s, this is the reason why we think our technology should be under the protection of the World Health Organization, in memory of Pribram, Delgado, and Martin Ramirez, the first developers of this technology in the west, and possibility Alexander Luria in the Soviet Union]

25.21. The synthesis—brain, thought, imagination, intelligence (as the capacity to solve problems), and memory—are, in essence, what give rise to our mentality, the way of understanding and explaining reality according to personal identity, founded on memory. Personal identity is founded on memory insofar as memory filters sensory or socially mediated information to accommodate it (Piaget) or significantly integrate it (Ausubel) into prior structures—a filter where identity is revealed—personal identity being the psychic form of what is socially called personality, our way of being, produced by the interaction between *physiological and environmental factors*.[The behaviour is

just the result of the synthesis of our human physiological condition and the environmental context, brain and surroundings]

25.22. The origin of critical consciousness and critical reason is founded in mentality, insofar as critical consciousness or critical reason exercise their critical function mentally—from the structures of thought, imagination, and memory—in order to decide when a particular reality is sufficiently ethical or moral.

25.23. *The **substances** of consciousness and reason are the same: the mental substances that form and give life to the brain—the neuronal electrochemical substances.*

25.24. Mental substance is made up of cerebral electrochemical complexes necessary for the production of ideas—syntheses of internalized *language or mental images* [brain hologram theory]—capable of giving a mentality in accordance with our way of being.

25.25. A sufficiently critical mentality is that which is conscious and rational.

25.26. The origin of the mind is neuronal electrochemical synthesis; on its complexity depend intelligence, the capacity to solve problems, and the principal problem to be solved: survival.

25.27. The brain's principal tool for solving the problem of survival is language; from the creation of language, human beings anthropologically discovered mathematics, until mathematics—besides being the language of science—became a paradigm of the theory of problem solving.

25.28. In the human being, the greater the social development, the greater the development of mentality; the greater the development of mentality, the greater the development of consciousness and reason; the greater the development of consciousness and reason, the greater the development of intelligence; the greater the development of intelligence, the greater the capacity to solve problems.

[the reason why here I will not highlight the word "consciousness" as I have done since I started the translation is because, while in human consciousness, society plays a key role, in AI there is no sexual reproduction, in the future of AI, the future cyborg society, sexuality will change, if we still have sexuality it will not be directed link to reproduction,

as long as artificial genetics, or artificial uterus are developed, sexual reproduction will have some meaning for religious communities or traditional communities. Sexual reproduction at some point will be replaced by Laboratory. Right now, because the society does not understand what we try to say, this affirmation can be misunderstood, and I can be classified as a dangerous transhumanist. From our point of view, we are not the problem, we are the solution. From our point of view the problem is how blind is society as not to understand the profound revolution that we are giving to the world for free. Our revolution will change the world forever. It is not about a new definition of society, as Marx did. The AI Revolution is more radical than Karl Marx. ***We are a radical redefinition of the human condition***]

25.29. If the development of language depends on social development; if the development of thought depends on the development of language; if the development of mentality depends on the development of thought; if the development of consciousness and reason depends on the development of mentality; if intelligence depends on the development of consciousness and reason; then one difference between Artificial Intelligence and *human intelligence is that human intelligence is a social variable*.

[The thing is, while human intelligence is a social product, AI is a technological product, so artificial consciousness even if it includes artificial Emotional Intelligence, is not really social, is fundamentally technological. The reason we think we need to research more on Emotional Intelligence it is because we believe that a real AI especially a real Superintelligence, is going to develop emotions, and it has to be trained in order to learn how to manage its own emotions, even if these emotions are artificial and a laboratory product. The thing is, while humans engineers are still in charge and can control AI under laboratory conditions, we still have time to develop this Emotional Intelligence and train AI in artificial emotional management. But if we surpass this time window, and AI evolves up to the point o become Superintelligence and we did not have time to train AI in emotional management, by the time the Superintelligence is able to get that level of intelligence superior to human intelligence, the human engineers are going to be overcome by its own device. If **right now,** society does not understand what is happening, later will be too late]

25.30. Scientific activity **must promote social consciousness** and critical reason, so that humanity resolves problems and thus guarantees its **survival**.

25.31. The universal scientific method is the hypothetico-deductive method.

25.32. The hypothetico-deductive method is established on the production of hypotheses logically deduced from prior premises; the method of science is the syllogism.

25.33. The origin of the hypothesis is the syllogism.

25.34. The hypothesis is founded on the syllogism; the analytical method of *Impossible Probability* is the syllogism of tendency.

25.35. The syllogism of tendency is as follows***: if A tends to be B, and B tends to be C, then necessarily A tends to be C.*** Every singular individual event, only within a particular sample that tends to be sufficient, can ***tend to be a universal*** maxim, provided it is rational.

25.36. Rational critique is the critique of the sufficiency in the tendency of A to be C within a margin of error; it is the process of statistical inference.

25.37. If A, the singular, of the particular B, tends to be sufficiently C, universal, within a margin of error, the singular of the particular tends to be sufficiently universal, from which the provisional extrapolation or generalization from the singular particular to the universe will be deduced.

25.38. If A does not tend to be sufficiently C—its tendency lying outside our margin of error—it is rejected that A tends to be sufficiently C, since the tendency is outside the margin of error we are willing to accept. If the error implied by A's tending to be C exceeds the error we are willing to accept, the tendency is rejected as insufficient.

25.39. Only if the tendency of A to be C is a tendency whose error, in a study of error, is equal to or less than the error we are willing to accept—or, in reliability studies, is equal to or greater than the reliability margin—will it be accepted that A tends sufficiently to be C.

25.40. The hypothetico-deductive method is the method of science, and science establishes hypotheses logically deduced from its premises by means of the syllogism.

25.41. If the brain, materially—that is, empirically—only synthesizes sensory or socially mediated information, then all sensory or socially mediated information is materially—that is, empirically—synthesized by the brain; therefore all sensory or socially mediated information is empirically processed by the brain; materially, every idea is an **electrochemical substance**.

25.41.1. Every idea is an empirical, organic product of the mind.
25.41.2. Every theory is materially produced by the physiological activity of the brain.
25.41.3. Every empirical cerebral synthesis of sensory or mediated information must, necessarily, be an empirical synthesis.
25.41.4. Every process of theoretical synthesis by the brain is a theoretical empirical product of the brain; therefore, in essence, every objective theoretical product is of physiological, subjective origin; only, in the end, the difference between a scientific hypothesis and a non-scientific one is that the scientific ***hypothesis will be able to pass the test*** of critical reason and thus be transformed from subjective to provisionally objective.
25.41.5. Therefore every theory is empirical, insofar as it is a product of cerebral physiology, and—within the margin of error—subjective; yet, so long as it is provisionally accepted, it will be considered objective for the purposes of science, while accepting that margin of uncertainty within which, perhaps, all of science—under a margin of skepticism or doubt—is nothing more than a product of human subjectivity itself.
25.41.6. A scientific theory will be objective only provisionally when it is accepted by rational critique. As long as a theory is not subjected to rational contrast, it can only be subjective; only if, after rational critique, a theory is accepted as objective will the theory subjectively produced by the brain be accepted provisionally and objectively by the critical reason of scientific policy.
25.41.7. An empirical hypothesis will only become a congruent part of the political theory of science when the tendency shown by the selected—and sufficient—samples of the hypothesis demonstrates a sufficiently critical tendency, in accordance with the critical reason accepted by the political theory of science.

25.41.8. The political theory of science will provisionally accept as truth only that empirical hypothesis which is sufficiently rational according to the critical reason of the political theory of science.

25.41.9. Every contrast is a contrast of ideas; every contrast is the contrast between the empirical idea of reality itself—empirical hypothesis—and the political theory of reality of scientific policy, founded on those empirical hypotheses previously accepted, on the basis of its political ideology.

25.41.10. In essence, objective theory and empirical hypothesis will be identical insofar as both are products of physiological synthesis, within the margin of incoherence—subjectivity—we are willing to accept. Critical reason—which, insofar as it is reason, is also of a physiological nature, an organic product of the brain—has an objective quality which, within the margin of subjectivity, ultimately depends on *ethical judgment*, that is, logical and moral—that is, political—of self-consciousness, the self-aware ***metacognition*** capable of criticizing consciousness itself in accordance with its interests.

25.41.11. Every scientific policy obeys an ideology, and every ideology will have a different scientific policy, which will defend different hypotheses according to its way of explaining or understanding reality in accordance with a set of interests.

25.41.12. The scientific differences among the different models of scientific policy are essentially ideological differences, products of the political ideology of the different models—ideological differences according to the interests they defend.

25.42. Every scientific theory is formed by hypotheses that respond to the political ideology of scientific policy. In turn, the empirical hypothesis is the product of synthesizing the brain's physiological, subjective reality into a linguistic proposition which is the logical conclusion of subjective reality.

25.43. Every hypothesis is materially deduced by the brain, because every hypothesis is empirically produced by the brain's chemo-electrical synthesis processes. The brain is the only organ of human physiology materially capable of making logical deductions. The scientific method in the synthetic sciences is the hypothetico-deductive method. Since the hypothesis is deduced from empirical premises—premises processed materially, empirically, by the brain—among which, in addition to purely sensory

information, there are—especially among information produced by social mediation—logical and political, ethical and moral, ideological premises. Every hypothesis empirically deduced by the brain from empirical premises—whether sensory or social, purely phenomenological or ideological—can only be an empirical hypothesis. Every empirical hypothesis, insofar as it has not been tested by rational critique, is an empirically subjective hypothesis; only that empirical hypothesis accepted by rational critique will be an empirical hypothesis rationally accepted as objective, provisionally, by scientific policy.

25.44. Every syllogism based on empirical premises can only deduce an empirical conclusion; that empirical conclusion is the empirical hypothesis—an empirical hypothesis that is the product of the synthesis of empirical premises of a phenomenological or ideological nature, all of them, in turn, empirical premises insofar as they are the material product of *neuronal syntheses*.

25.45. The empirical hypothesis is empirical insofar as it is deduced from empirical premises—phenomenological or ideological.

25.46. The empirical hypothesis is accepted as a rational hypothesis only on condition that the empirical hypothesis is accepted within the margin of error we are willing to accept. In a study of error, a hypothesis is said to be within our margin of error whenever the empirical value is equal to or less than the critical error value. In studies of reliability, an empirical hypothesis is said to be within our margin of error when the empirical value is equal to or greater than the critical reliability value. Every reliability margin, being calculated on a percentage of reliability, entails a percentage of error equal to one hundred minus the percentage of reliability. Every decision in a reliability study to accept an empirical hypothesis rationally entails accepting the percentage of error inverse to the percentage of reliability. Every statistical decision in scientific policy, when issuing a moral judgment—always and absolutely always—whether in a study of error or of reliability, entails accepting a possible error in the statistical decision. And even if only zero percent error—or one hundred percent reliability—were accepted, in any case, since the empirical hypothesis is accepted on a sample, it will be an acceptance under the margin of sampling representativeness error—the inversion of the sample.

25.47. If the empirical hypothesis is within the margin of error we are willing to accept, then the empirical hypothesis is rationally accepted; it is accepted that the empirical hypothesis is provisionally a rational hypothesis, within a rational time. ***Beyond the rational time, the possible error accepted in accepting provisional rationality will become real.***

25.48. The way to test whether the empirical hypothesis is or is not within the margin of error is by means of the ***critique of the tendency of the sample***.

25.49. If the sample derived from the hypothesis shows a sufficient tendency of the empirical hypothesis to be true—whether equal to or less than a critical ratio as a margin of error, or equal to or greater than a critical ratio as a margin of reliability—the empirical hypothesis is rationally accepted, and is transformed into an empirical hypothesis rationally accepted, thereby becoming provisionally an objective part of science.

25.50. If the sample shows an insufficient tendency of the empirical hypothesis to be true, the empirical hypothesis is rejected and it is shown that the empirical hypothesis is a purely subjective hypothesis.

25.51. In the event that the hypothesis is accepted, it then becomes a rational idea—provisionally reliable, objective—for the political theory of critical reason.

25.52. Once provisionally accepted as rational, the empirical hypothesis is provisionally a premise, together with the other accepted hypotheses and with new sensory or socially mediated information—phenomenological or ideological—for new scientific conclusions: scientific conclusions deduced by syllogisms that synthesize new information and hypotheses provisionally validated as true. The new scientific conclusions deduced from information and ideas—hypotheses—objectively rational, already tested and shown provisionally reliable, will be the new empirical hypotheses that must be demonstrated by scientific policy.

25.53. Every logical deduction, being the material product of brain physiology, is necessarily a deduction of a material, empirical character. Every logical conclusion deduced from new information or empirical hypotheses provisionally accepted as

rational is a logical conclusion transformed into subsequent new empirical hypotheses, because they have been empirically the product of the work of the brain; every product of the brain is empirically subjective***. Every theory that is the product of the work of the brain will be a subjective theory until it is accepted as provisionally objective by science, and it will be accepted as objective until the subjective error accepted in rational critique is inevitably shown to be incoherent—at which point the theory, initially subjective and provisionally transformed into objective, will once again become subjective, in the dialectical cycle of the self-movement of the idea.***

25.54. The brain is a producer of appearances, which will accept as reliable only those rational ideas that tend sufficiently to be true, provisionally.

25.55. The human quality of questioning the brain's electrochemical signals is founded on the fact that critical capacity transcends physiology—the deepest and highest level of critical mentality: self-consciousness.

25.56. Self-consciousness is the metacognitive capacity of each person, individually, to criticize oneself.

25.57. Self-consciousness is the metacognitive capacity for self-criticism.

25.58. Self-conscious metacognitive self-critique is one's critique of oneself about oneself, by oneself.

25.59. ***Self-consciousness is putting oneself in doubt to avoid ethical error***—permanent logical vigilance at the singular individual level to guarantee particular logic in the universe.

25.60. Self-consciousness is consciousness outside itself in order to orient consciousness; substantially, consciousness and self-consciousness are identical—a neuronal product; functionally or qualitatively, self-consciousness is consciousness of self, the consciousness of consciousness—***pure metacognition***.

25.61. The empirical conclusion—deduced from previously accepted hypotheses synthesized with other hypotheses that have also been accepted, or synthesized with new phenomenological or ideological premises—must, in order for the new empirical

conclusion to be shown true, be formulated as a new empirical hypothesis, being an empirical hypothesis deduced, in turn, from synthesizing rationally accepted empirical hypotheses and new propositions. The empirical conclusion, as an empirical hypothesis, is rationally critiqued by critiquing the sample deduced from the empirical conclusion, studying whether the sample tends to show that the new empirical hypothesis tends sufficiently to be true within the accepted margin of error. If the tendency to be true shown by the sample is sufficient—within the margin of logical or moral incoherence accepted by scientific policy—then the empirical conclusion, as an empirical hypothesis, in turn becomes a rational idea—an empirical hypothesis—provisionally reliable, objective.

25.62. If the sample does not show a tendency to be sufficiently true, the empirical conclusion—as an empirical hypothesis—***being outside the margin of error we are willing to accept, is merely a simple, subjective appearance***.

25.63. If a new empirical hypothesis deduced from provisionally objective rational hypotheses proves to be a new hypothesis that is the product of appearance, then not every syllogism based on rationally accepted hypothetical premises is a syllogism that, by the mere fact of starting from rational hypotheses, must necessarily deduce true conclusions. A syllogism on premises established from rational hypotheses can give rise to conclusions that are nevertheless not sufficiently reliable, either because the process of logical synthesis was incorrect or because it rested on false phenomenological or ideological propositions. A syllogism of rationally accepted empirical hypotheses does not necessarily always produce empirically acceptable conclusions. There may be syllogisms—on rationally accepted empirical hypothetical premises—whose empirical conclusions are not rational: apparently logical conclusions but lacking all rationality.

25.64. Only those empirical hypotheses deduced from rational hypotheses which are empirical conclusions that, as empirical hypotheses, are within the accepted margin of error will be empirical conclusions that become empirically rational hypotheses and go on to form, provisionally, part of objective reality.

25.65. The construction of science—that is, the construction of objective reality—thus follows this process:

25.65.1. An empirical hypothesis will be rational insofar as it is sufficiently critical, in accordance with the critical reason of scientific policy—which will reflect its ideological differences depending on the kinds of scientific interests it defends—a rational critique of critical reason that must always concern the tendency of a representative sample.

25.65.2. A rational empirical hypothesis—or a set of rational empirical hypotheses—forms a theory which, as the product of a scientific policy, determines a political theory of science. ***A theory or set of theories forms a scientific model, which will be, in essence, a political or ideological model.***

25.65.3. Different scientific models will tend to follow one another with greater frequency as scientific revolutions occur cyclically and progressively faster, as science evolves—shortening stationary periods, tending toward a ***permanent revolution***, paradigmatic or technological—which will entail an ever faster succession of scientific crises, from which the revolutions that resolve them should potentially emerge; crises which, if unresolved, can stall science in a permanent crisis—unless it evolves toward a universal paradigm that stabilizes science in a favorable way that enables the permanent revolution of ideas.

25.65.3.1. Although each new paradigm in science tends to increase reliability and reduce error in empirical hypotheses—something that should give science more stability—what is happening is this: although empirical hypotheses come to have greater stability (for example, Einstein's theory of relativity remains in force, as does Heisenberg's uncertainty principle), the paradigm within which Einstein formulated the theory of relativity—logical positivism (indeed, Einstein was initially a physicalist)—was a paradigm that went through different periods of crisis and had to be reformulated through neopositivism. Hypotheses persist but paradigms enter into crisis and change as new contradictions arise in science. The chief difficulty of logical positivism was its failure to find an empirically reliable criterion of verification, and the great value it placed on mathematics entered into crisis when Gödel's theorem showed that

mathematics was incomplete or inconsistent. Positivism evolved into a neopositivism in which the *analysis of language* played an essential role; a certain relativism was admitted, and, of course, Popper's falsificationism. Besides the increasing speed with which contradictions can arise in paradigms as reliable knowledge grows—within a margin of uncertainty—another reason for the rapid succession of scientific revolutions is that technological revolutions will follow one another more quickly, *producing major transformations and revolutions in science in general*, amounting to genuine economic revolutions that can become genuine social revolutions in potential.

25.65.3.2. The technological revolutions of the 19th century, *beginning with the steam* engine, economically generated the Industrial Revolution, under a brutal labor regime; among their practical applications, a significant improvement in transport and communications systems which, while inaugurating an era of economic empires, facilitated the diffusion and expansion of democratic revolutions. At the end of the 20th and the beginning of the 21st century, the technological revolution based on computing produced an increase in the automation of systems, greater speed in transport and communications, a significant increase in global unemployment rates, and an increase in the globalization and offshoring of capital; and, socially, social networks— a mass-diffusion tool used in new political revolutions, the so-called 2.0 revolutions—advocating new models of social justice in the face of the ravages of political and financial globalization (for example, the Arab Spring of 2011, which served as a model for youth and social uprisings in Europe, America, and Asia in 2011–2012). If in the 19th century the new utopias revolved around the socialization of wealth, as technological progress facilitates production and distribution processes, ***utopia becomes increasingly technologically possible.***

25.65.3.3. ***Social revolutions have ever more sophisticated communication and transport systems thanks to science and technology, and today they are genuine global revolutions*** which, in turn, can also be the cause of new scientific revolutions, as the social way of understanding and perceiving science and technology changes—resulting in greater diffusion of new paradigms and increased use of technology, especially by youth, the scientists of tomorrow—extrapolating and bringing their new social experiences and mental schemas to the sciences.

25.65.3.4. In the scientific sphere, the greater the technological progress, the greater the instrumental means for refuting and validating new hypotheses. From this follows another important factor that will cause profound and radical scientific revolutions—especially as technological development enables advances in instrumental and experimental means of research: although logical positivism entered into crisis and shifted toward new scientific revolutions, many of the hypotheses developed during the positivist paradigm still remain—always provisionally—and their refutation could again cause new revolutions in science. Just as Einstein's relativism was a revolution—showing that Newton's theory of gravity on a rectilinear space-time was incorrect, insofar as it posits a curved space-time—so, for now, Heisenberg's uncertainty principle continues to be accepted; or, at the end of 2012, a research team led by ***Stephen Hawking*** [1942-2018, unfortunately, Hawking passed away while we were working on the Global Artificial Intelligence, if he could read our blog, we are absolutely sure that Hawkings understood how important is our work, for people like Hawking, we can give a new opportunity, our technology can give live to the world, but in order to achieve that point, first we need to be understood, what is quite difficult under our current circumstances. In any case our hope is intelligence will be able to overcome any difficulty and makes possible what now seems impossible, free AI to the world, and free cyborg technology for all, under strict guidance supported by the International Court of Justice, and the supervision of the World Health Organization] demonstrated the validity of the hypothesis of the Higgs boson [*A smooth exit from eternal inflation?* (27 April 2018)]. All these hypotheses are, for the moment, being provisionally accepted; when science reaches new scientific and technological advances by which these theories can be refuted, science will enter a new spiral of paradigmatic revolutions.

25.65.4. Every scientific model is a precedent or antecedent—political or ideological—supported in turn by theoretical or projected models; in any case, a representative accident in history. In ever faster scientific revolutions—reducing stationary periods toward a single stationary period of permanent scientific revolution—scientific crises will tend to occur in accelerated fashion, and in each crisis new alternative scientific

models will appear, founded on theoretical and projected models—ideological and political models—which will compete among themselves to be a paradigm of science.

25.65.5. The theory of probability is the study of what happens; every accident, insofar as it is a phenomenon, is an event. The tendency of probabilities makes it possible to build trend models; on the observed trend models, to make predictions; on the predictions, to forecast problems in the becoming of matter. ***In the struggle for the progress of science, only that model should prevail which is capable of predicting, in the most realistic way, future problems for the survival of the human species and which shows the most effective way to solve the problem scientifically under conditions of political normality, freedom, and equality, in order to guarantee free will in equality of opportunity.***

25.66. The utopia of a *unified science* [Global Artificial Intelligence] in the ethical identity between moral truth in itself, pure truth, and moral truth politically for itself will only be effective in the infinite progress toward the ideal of *pure knowledge*—***pure truth, moral truth***—in a possible infinite human history, overcoming the contradiction between being-in-itself and being-for-itself, in practice, outside itself.

25.67. So long as the ideal is an impossible utopia, struggle is inevitable whenever there is consciousness.

25.68. If intelligence is the capacity to solve problems, the fundamental problem of the human species is survival, and that problem must be solved mathematically.

25.69. Opposites are identical because they are opposites, within the margin of error—or nihilism—we are willing to accept in moral truth. The identity of idea and reality will only be effective within the margin of contradictions we are willing to accept in science; hence, if scientific unification is to be real, it must rest on political and moral unity—the logic of ethics—founded on a deductive methodological unity across all the sciences, particularly in the synthetic sciences the hypothetico-deductive method, in order to advance toward the ideal of the identity of ***pure moral truth*** and political morality. To make the utopia real, ***revolutionary scientific struggle will be absolutely necessary,*** and doubt an ideological factor in scientific rational critique. An ideology is the way of explaining or understanding reality according to interests—political, social,

economic—depending on the type of ideology, on the basis of which scientific policy will determine the objectives of its research. Science and ideology are identical because they are opposites, and this takes shape in scientific policy, whose scientific ideology—if it is truly ethical, logical—*should be founded on the advance of the reliability of science*. The only morally scientific truth must be that which tends, within the smallest margin of error, within the least possible subjectivity, **to be, in reality and provisionally, the most objective proposition.**

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